IBM WebSphere Business Modeler: Process Simulation and Analysis

(Course code VB186)
(Classroom Course code WB186)

Student Notebook

ERC 1.0

WebSphere Education

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Course description

IBM WebSphere Business Modeler: Process Simulation and Analysis

Duration: 2 days over a one-week period

Purpose

This course is a self-paced, distance learning version of course WB186. Students complete two days of material at their own pace during a one-week period, using online tools to view and listen to the pre-recorded lectures. The course also includes hands-on lab exercises, e-mail support from product experts, and two optional live interactive sessions hosted by an instructor to discuss questions about the course material.

The course teaches students how to conduct process simulation and analysis using the powerful features and capabilities of WebSphere Business Modeler. The course focuses on concepts and procedures involved in setting up and running simulations, profile and dynamic analysis, statistical distributions, process improvement, custom reporting, and the use of the administration portal in Web publishing.

Hands-on lab exercises give students the opportunity to define simulation settings, run simulations, conduct analysis, and create custom reports. Students perform lab exercises in redesigning the process model and conducting comparative analysis. To complete the hands-on lab exercises, students download Modeler software and course material to their computers.

Audience

This course is designed for bBusiness analysts, implementation consultants, project managers, support engineers, and sales and marketing professionals.

Prerequisites

Before taking this course, students should complete course WB184 or VB184, *IBM WebSphere Business Modeler: Process Mapping and Analysis.*

Agenda

(0:20) Module 1. Introduction and Course Agenda
(0:00) Exercise 1. There is no exercise for this unit

(0:45) Module 2. Review of process mapping and analysis
(0:00) Exercise 2. There is no exercise for this unit

(0:45) Module 3. Introduction to simulation and analysis
(0:00) Exercise 3. There is no exercise for this unit

(1:00) Module 4. Setting up and running simulations
(1:00) Exercise 4. Simulation and analysis

(0:30) Module 5. Profile and dynamic analysis
(0:45) Exercise 5. Dynamic analysis

(0:30) Module 6. Statistical distribution
(1:00) Exercise 6. Simulation with statistical distribution

(0:30) Module 7. Process improvement
(1:00) Exercise 7. Process improvement

(0:30) Module 8. Custom reports and queries
(1:15) Exercise 8. Create custom report

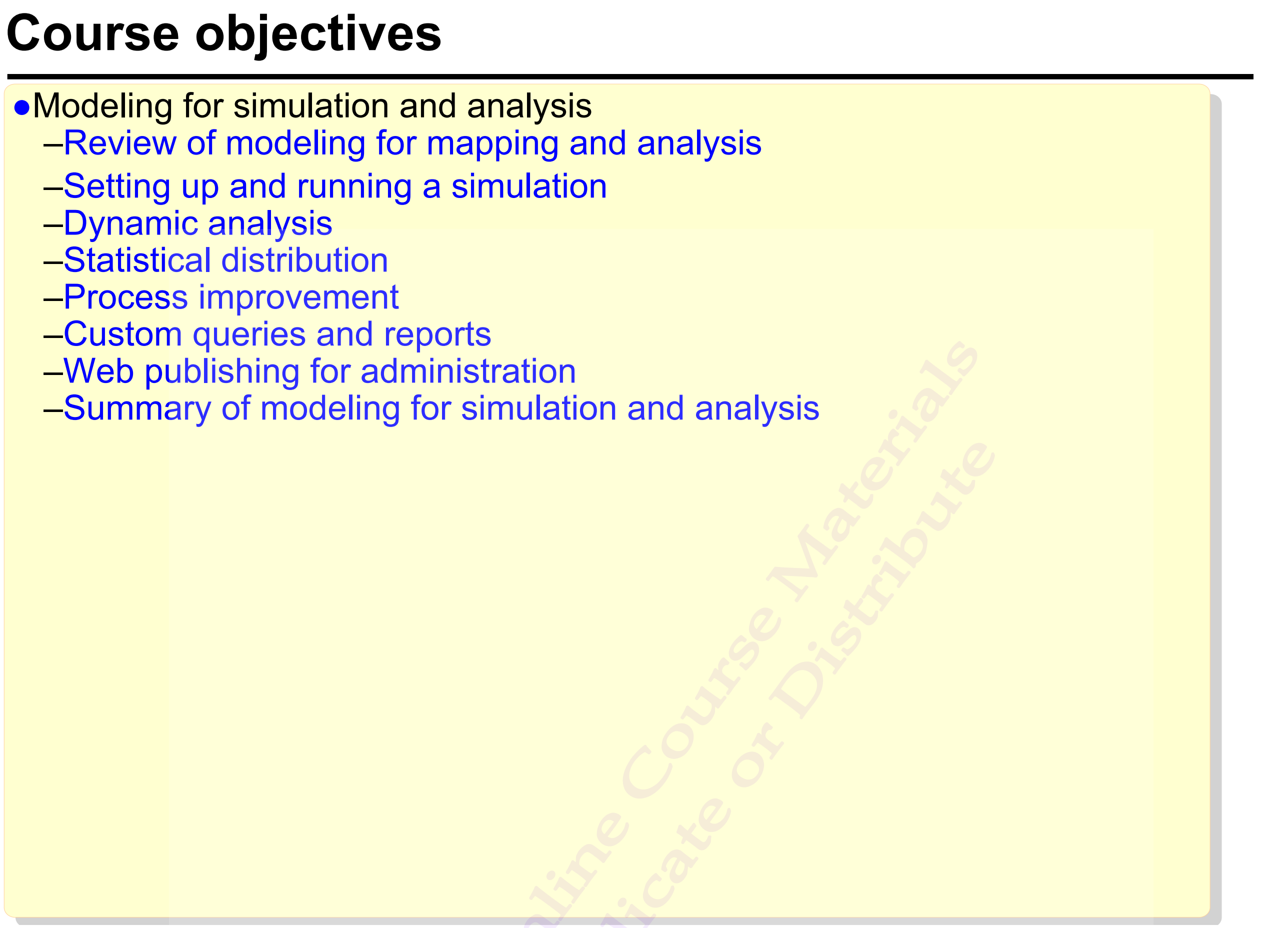
(0:30) Module 9. Administration for Web publishing
(0:00) Exercise 9. There is no exercise for this unit

(0:30) Module 10. Summary of simulation and analysis
(0:00) Exercise 10. There is no exercise for this unit

Unit 1. IBM WebSphere Business Modeler: Process Simulation and Analysis

What this unit is about

This unit describes the course agenda and objectives.

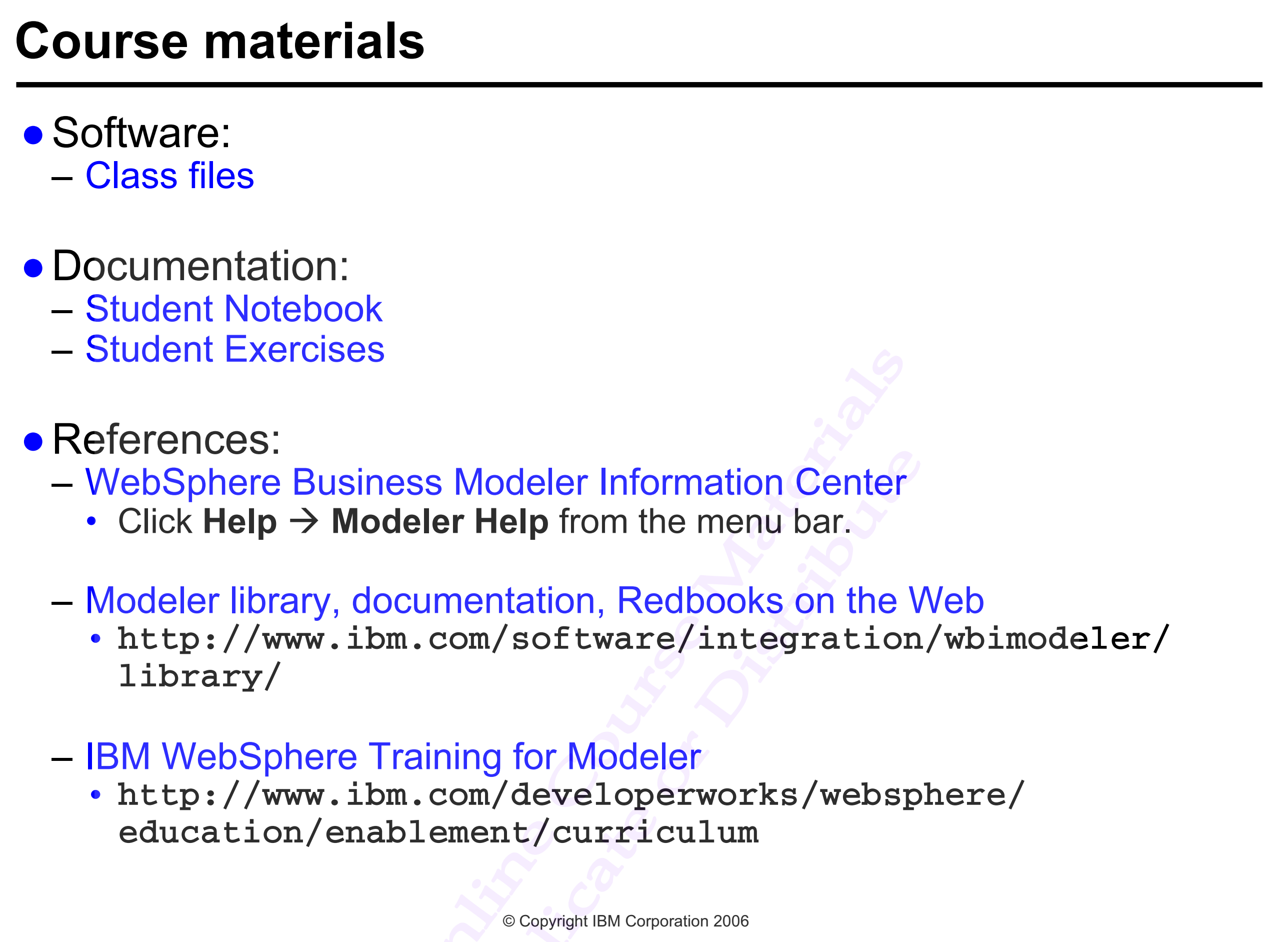


Course objectives

- Modeling for simulation and analysis
  - Review of modeling for mapping and analysis
  - Setting up and running a simulation
  - Dynamic analysis
  - Statistical distribution
  - Process improvement
  - Custom queries and reports
  - Web publishing for administration
  - Summary of modeling for simulation and analysis

Figure 1-1. Course objectives VB1861.0

Notes:



Course materials

- Software:
  - Class files
- Documentation:
  - Student Notebook
  - Student Exercises
- References:
  - WebSphere Business Modeler Information Center
    - Click **Help** → **Modeler Help** from the menu bar.
  - Modeler library, documentation, Redbooks on the Web
    - `http://www.ibm.com/software/integration/wbimodeler/library/`
  - IBM WebSphere Training for Modeler
    - `http://www.ibm.com/developerworks/websphere/education/enablement/curriculum`

Figure 1-2. Course materials VB1861.0

Notes:

Modeler course roadmap

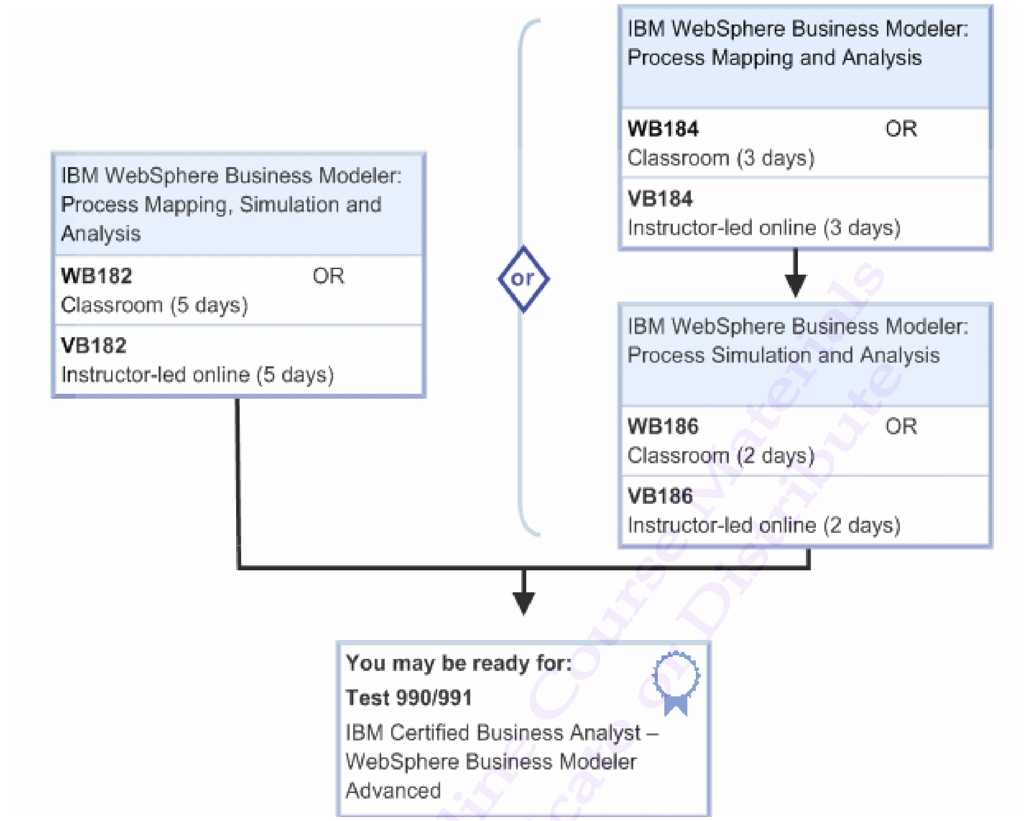

IBM WebSphere Business Modeler: Process Mapping, Simulation and Analysis
WB182 OR
Classroom (5 days)
VB182
Instructor-led online (5 days)
or
IBM WebSphere Business Modeler: Process Mapping and Analysis
WB184 OR
Classroom (3 days)
VB184
Instructor-led online (3 days)
IBM WebSphere Business Modeler: Process Simulation and Analysis
WB186 OR
Classroom (2 days)
VB186
Instructor-led online (2 days)
You may be ready for:
Test 990/991
IBM Certified Business Analyst – WebSphere Business Modeler Advanced

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Figure 1-3. Modeler course roadmap VB1861.0

Notes:

For up-to-date Modeler course information, please visit http://www.ibm.com/developerworks/websphere/education/enablement/curriculum/c-wbi-modeler.html

Course evaluation

- On the final day of class, complete the electronic course evaluation

Figure 1-4. Course evaluation VB1861.0

Notes:

Unit 2. Summary of process mapping and analysis

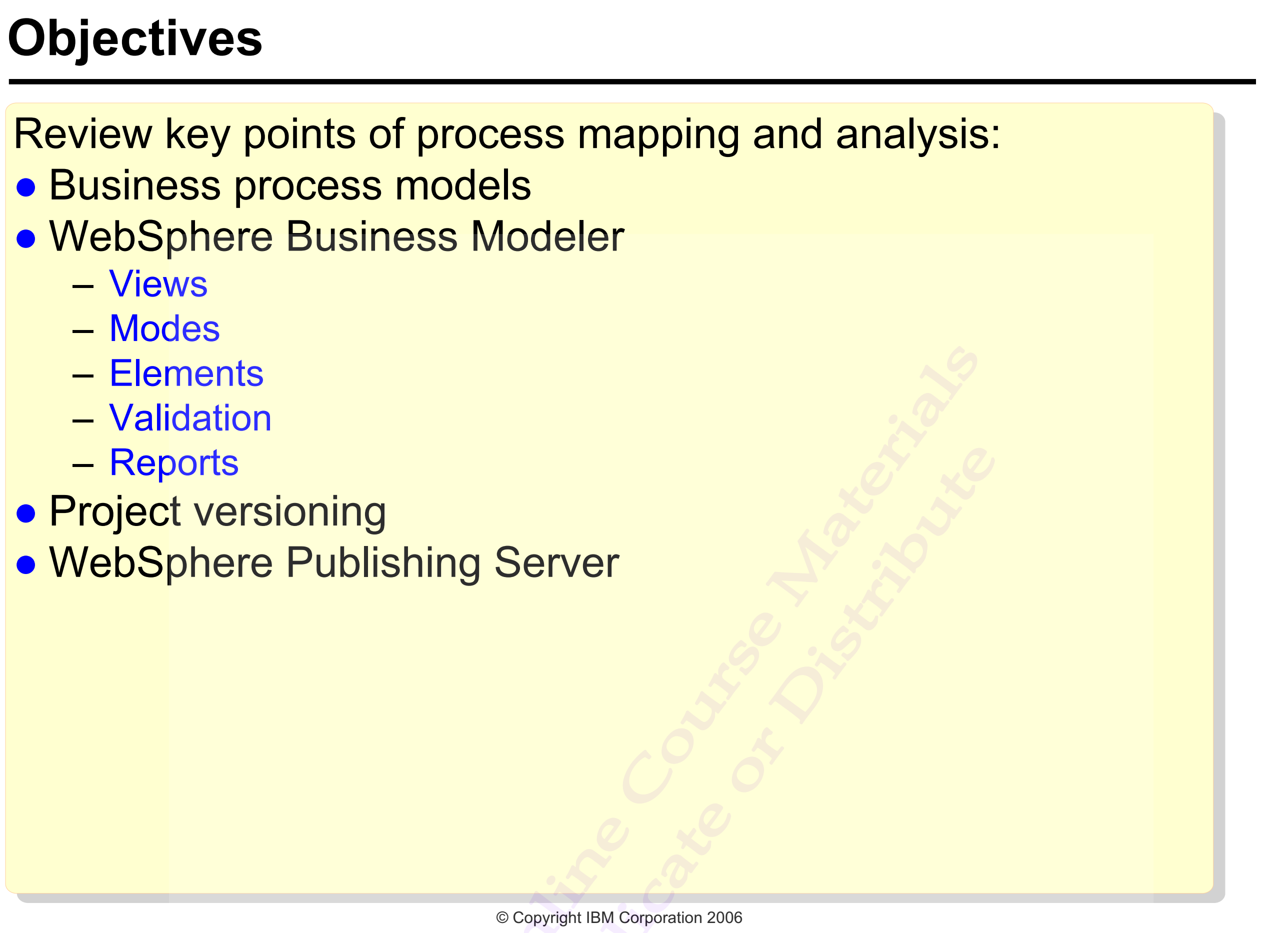
What this unit is about

This unit reviews the process mapping and analysis.

What you should be able to do

After completing this unit, you should be able to:

- Review key points in course:
  - Business process models
  - WebSphere Business Modeler
  - Views
  - Modes
  - Elements
  - Validation
  - Reports
  - Project versioning
  - WebSphere Publishing Server



Objectives

Review key points of process mapping and analysis:

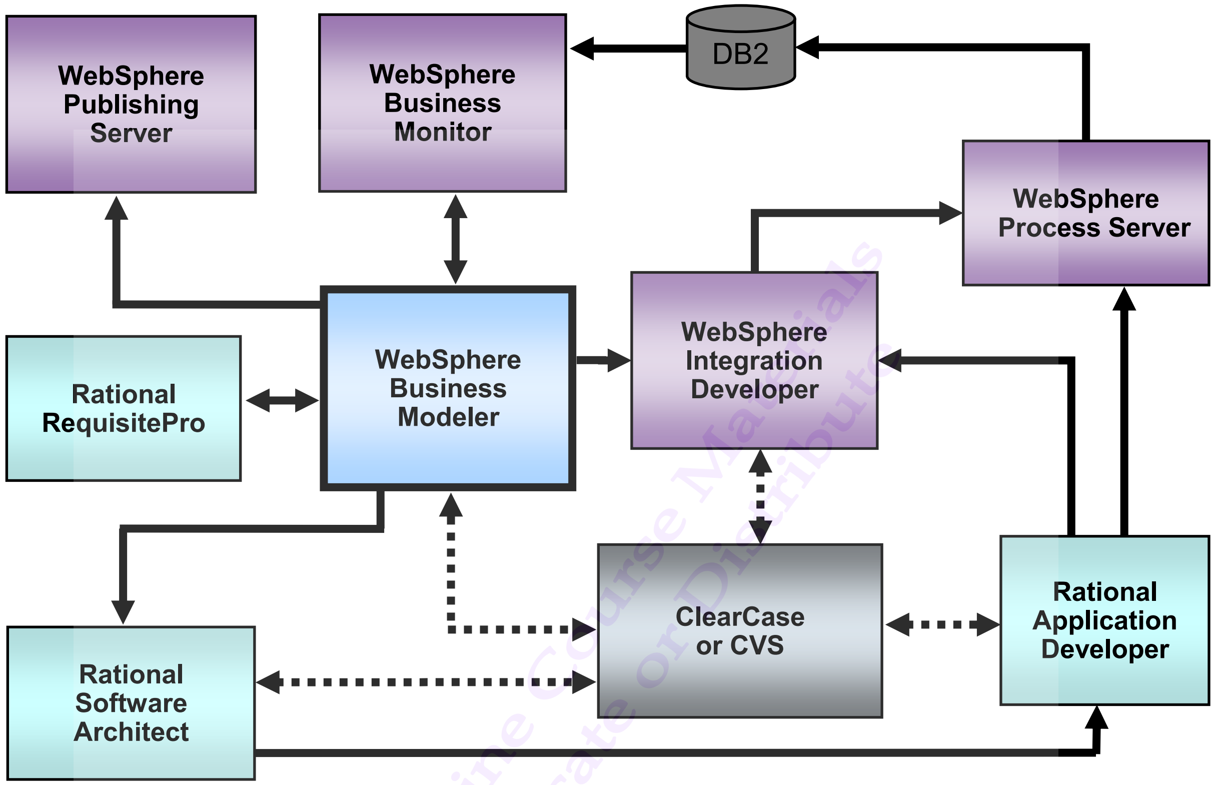
- Business process models
- WebSphere Business Modeler
  - Views
  - Modes
  - Elements
  - Validation
  - Reports
- Project versioning
- WebSphere Publishing Server

Figure 2-1. Objectives

VB1861.0

Notes:

Products covered in this course



WebSphere Publishing Server

WebSphere Business Monitor

DB2

WebSphere Process Server

Rational RequisitePro

WebSphere Business Modeler

WebSphere Integration Developer

ClearCase or CVS

Rational Application Developer

Rational Software Architect

Figure 2-2. Products covered in this course VB1861.0

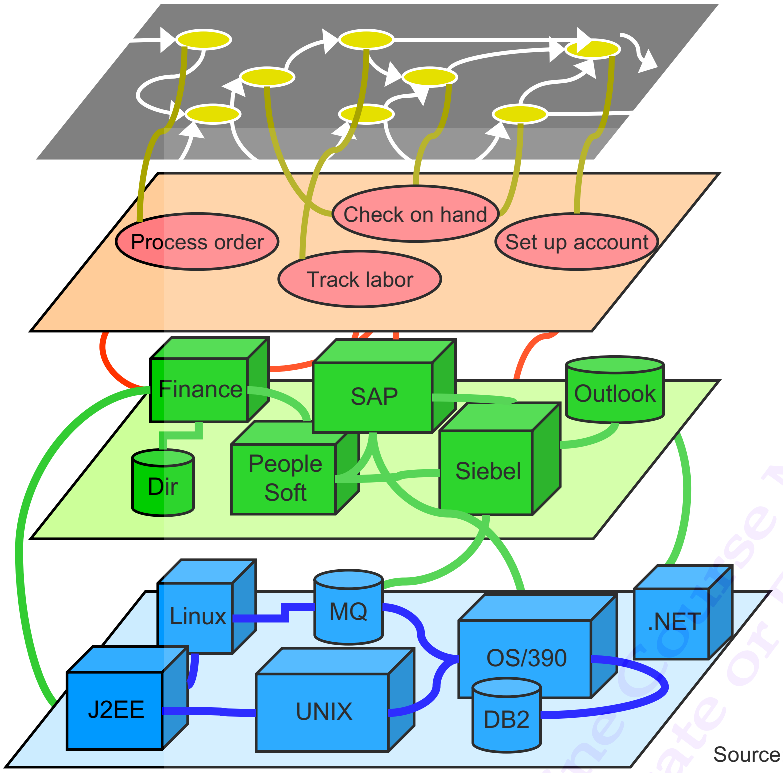
Notes:

Legend:

- - - - - - Version control flow (dashed line)

——— Development flow (solid line)

The relationship between the process and technology



Business process layer

- Cross functional end-to-end sales order process

Service layer

- Used to connect sales to customer, for example

Application layer

- Applications, components, software

Technology layer

- Hardware, network
- Connect J2EE to .NET

Source: CBDi Forum, `http://www.cbdiforum.com`

Figure 2-3. The relationship between the process and technology VB1861.0

Notes:

CBD: component-based development

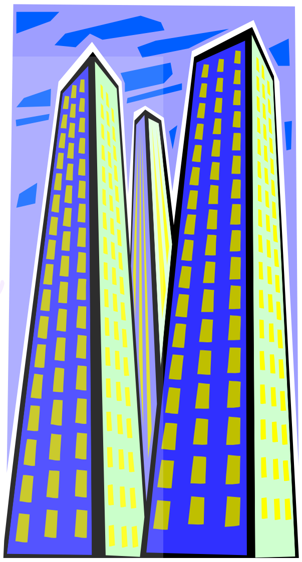
This relationship of business components and services as supported by IT can be best depicted as layers, each adding a level of definition needed to support the business processes where people accomplish the tasks necessary to deliver value to a customer. For the business analyst, the new service layer provides a good interface between the business process and all of the technology needed to support the business.

When do you need to model something?

- Modeling is the standard approach in engineering to
  - Manage complexity
  - Mitigate risk
- Software development is the same as every kind of engineering in this respect

Well, maybe
you should not

But then, maybe
you should



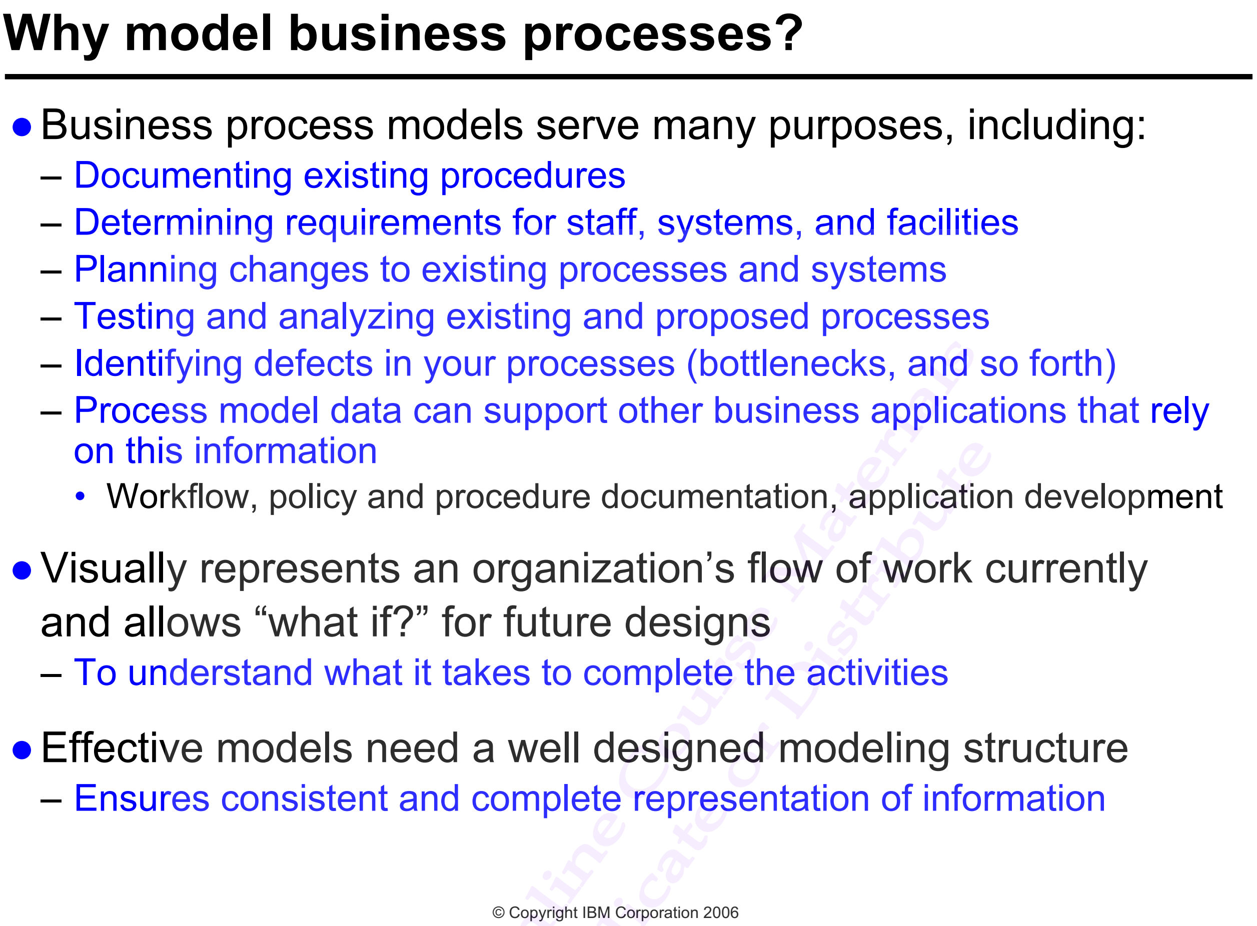
Now, you ***must!***

Figure 2-4. When do you need to model something? VB1861.0

Notes:

Modeling lets you manage complexity and risk.

- Not all projects require models in order to be successful.
- The more complex a project, the more it needs models.
- Software is no different from every other kind of engineering, in this respect.



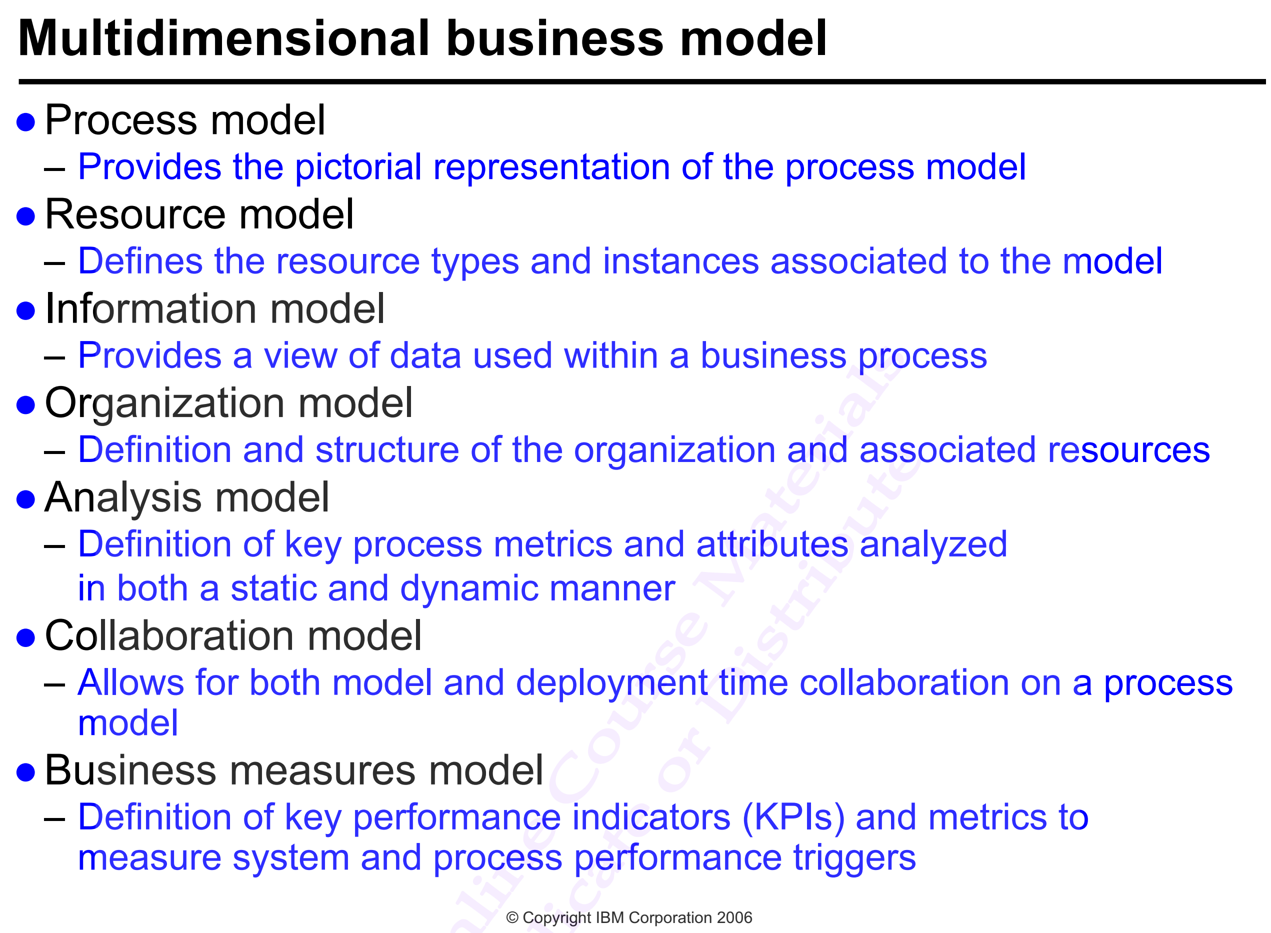
Why model business processes?

- Business process models serve many purposes, including:
  - Documenting existing procedures
  - Determining requirements for staff, systems, and facilities
  - Planning changes to existing processes and systems
  - Testing and analyzing existing and proposed processes
  - Identifying defects in your processes (bottlenecks, and so forth)
  - Process model data can support other business applications that rely on this information
    - Workflow, policy and procedure documentation, application development
- Visually represents an organization’s flow of work currently and allows “what if?” for future designs
  - To understand what it takes to complete the activities
- Effective models need a well designed modeling structure
  - Ensures consistent and complete representation of information

Figure 2-5. Why model business processes? VB1861.0

Notes:

Why the process layer — communication of all parties, both business and technology, a solid foundation for the future responsiveness of the enterprise to change. Today’s software systems are no longer simple like the dog house; they are more complicated like the skyscraper. It is very difficult to understand them without a model. They are also very expensive to implement; therefore it is important to understand the outcome before you start to build them.



Multidimensional business model

- Process model
  - Provides the pictorial representation of the process model
- Resource model
  - Defines the resource types and instances associated to the model
- Information model
  - Provides a view of data used within a business process
- Organization model
  - Definition and structure of the organization and associated resources
- Analysis model
  - Definition of key process metrics and attributes analyzed in both a static and dynamic manner
- Collaboration model
  - Allows for both model and deployment time collaboration on a process model
- Business measures model
  - Definition of key performance indicators (KPIs) and metrics to measure system and process performance triggers

Figure 2-6. Multidimensional business model VB1861.0

Notes:

Unlike one big drawing of a business process, the modeler uses several different models to represent the different aspects of a business process. Working together, the different models provide a complete representation of the business process.

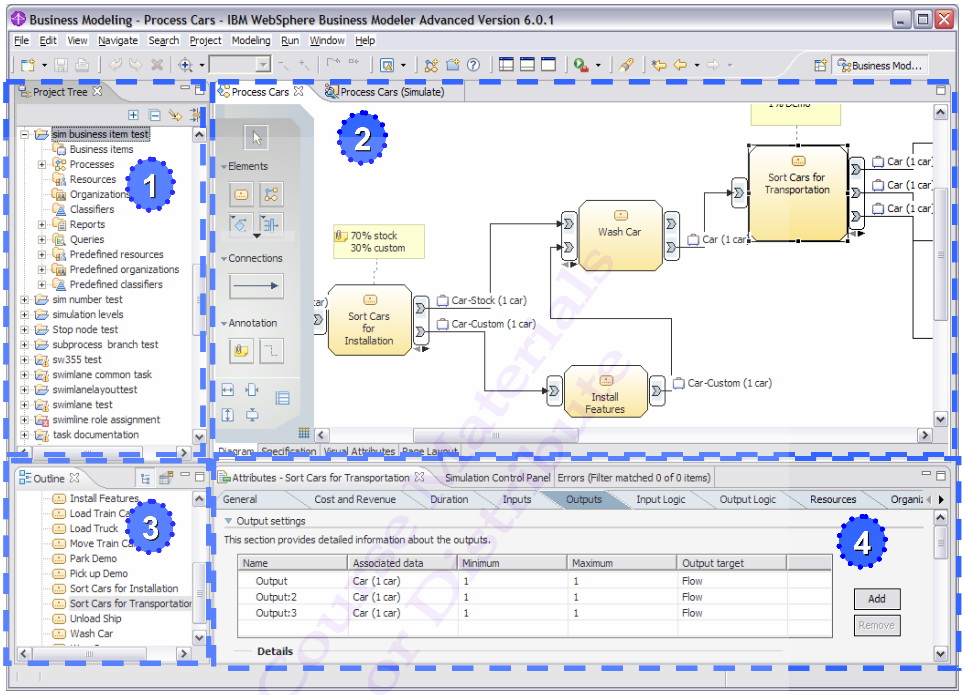
Modeler supports a heuristic approach

- Heuristic approach
  - Used for problems that lack an optimal solution such as a process design
- Heuristic problem solving
  - Involves creating a set of rules or a procedure to solve problems
  - Uses experimental and trial-and-error methods
  - Based on requirements and constraints
- Potential process requirements and constraints
  - Time to complete
  - Cost to complete
  - Number of resources available
  - Schedule of resources
  - Number of paths or cases to follow
  - Frequency of process instances and starts

Figure 2-7. Modeler supports a heuristic approach VB1861.0

Notes:

The four-pane view is the default modeler desktop



Output settings

This section provides detailed information about the outputs.

Name	Associated data	Minimum	Maximum	Output target
Output	Car (1 car)	1	1	Flow
Output:2	Car (1 car)	1	1	Flow
Output:3	Car (1 car)	1	1	Flow

1 Project Tree view
- Shows all the elements available to be used in the model, plus:
  - Resources
  - Organizations

2 Process Editor view
- The area where models are created
- Other editors open in the same pane

3 Outline view
- Index to elements on the process model

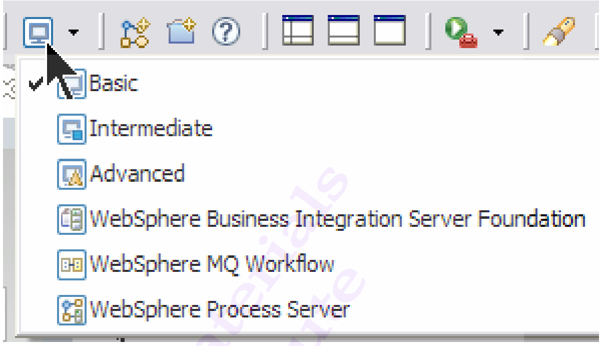
4 Attribute view
- All of the details associated with the element selected on the diagram
- This pane is also used to display analysis results

Figure 2-8. The four-pane view is the default modeler desktop VB1861.0

Notes:

Six modeling modes

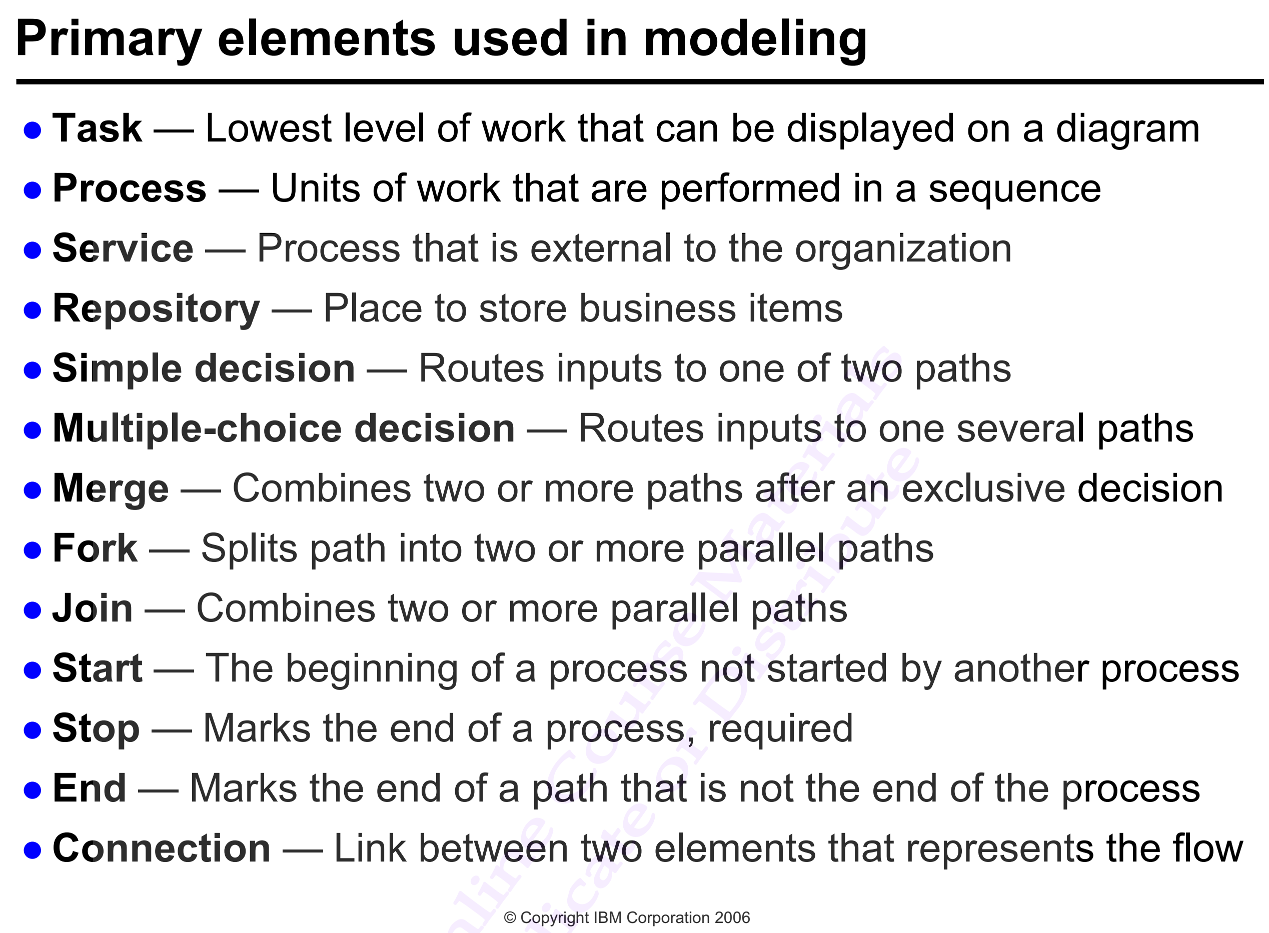
- Three modes for creating process modeling:
  - Basic business modeling
  - Intermediate business modeling
  - Advanced business modeling
- Three modes for applying validation rules:
  - WebSphere Business Integration Server
  - WebSphere MQ Workflow
  - WebSphere Process Server



- Switching from basic to more advanced modes, the following changes occur:
  - Some options become disabled.
  - Some notational elements become disabled.
  - A previously valid model may no longer be valid because the new mode has additional validation rules.
- No information is lost when you switch modes.

Figure 2-9. Six modeling modes VB1861.0

Notes:



Primary elements used in modeling

- **Task** — Lowest level of work that can be displayed on a diagram
- **Process** — Units of work that are performed in a sequence
- **Service** — Process that is external to the organization
- **Repository** — Place to store business items
- **Simple decision** — Routes inputs to one of two paths
- **Multiple-choice decision** — Routes inputs to one several paths
- **Merge** — Combines two or more paths after an exclusive decision
- **Fork** — Splits path into two or more parallel paths
- **Join** — Combines two or more parallel paths
- **Start** — The beginning of a process not started by another process
- **Stop** — Marks the end of a process, required
- **End** — Marks the end of a path that is not the end of the process
- **Connection** — Link between two elements that represents the flow

Figure 2-10. Primary elements used in modeling VB1861.0

Notes:

Adding relevant information

- A model includes a map with relevant information added.
- Information on what is received, worked on, and produced:
  - Business items
- Information about who performs the work and when:
  - Resources
  - Roles
  - Timetables
- Information on how the company is organized:
  - Organization unit
  - Location
  - Structure
- Information on grouping related information for analysis:
  - Classifiers

Figure 2-11. Adding relevant information VB1861.0

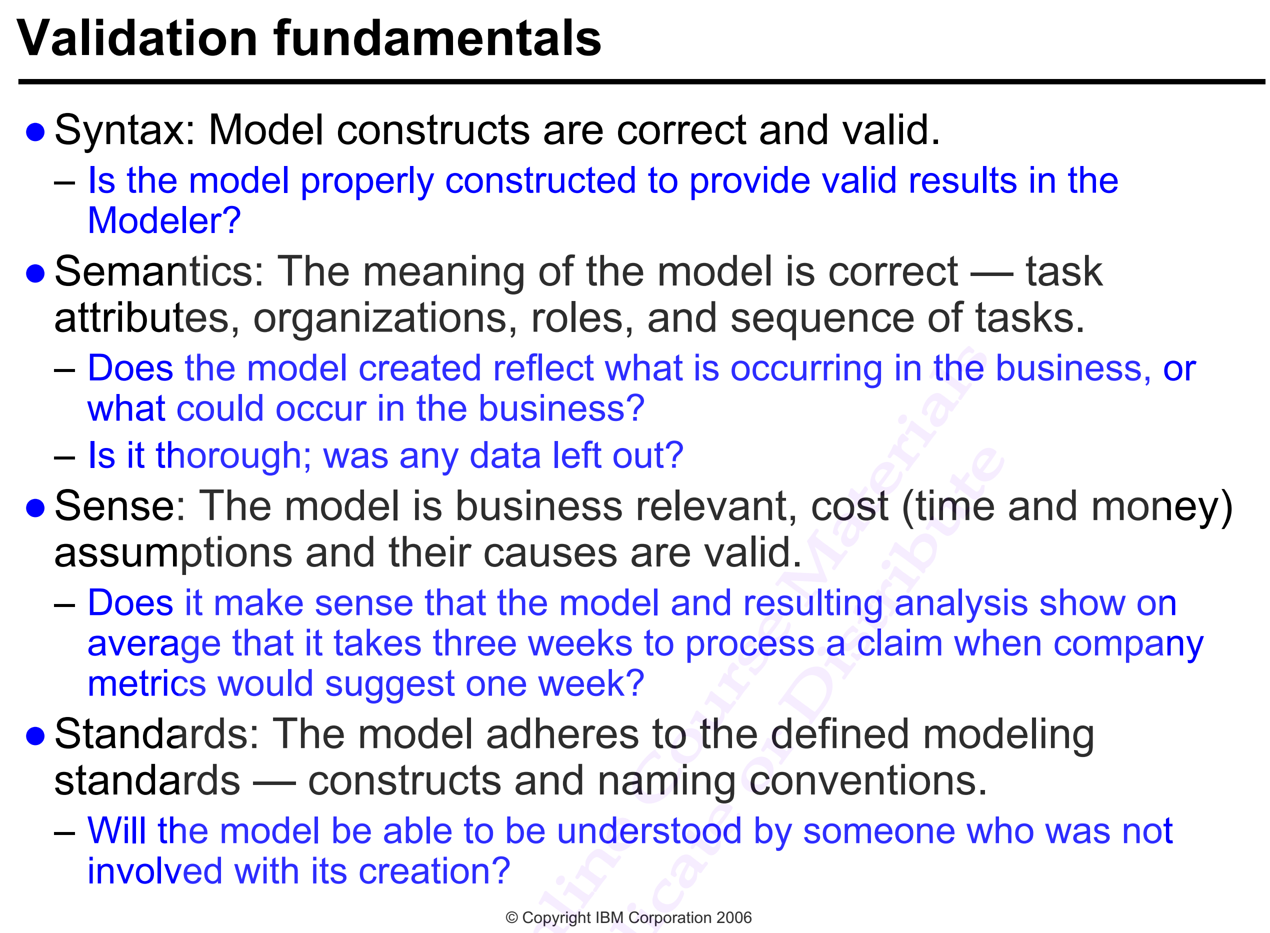
Notes:

Additional elements

- Making a model more realistic
  - Timer
    - Initiates a flow at a specified point in time
  - Map
    - Transforms data from one structure to another
  - Broadcaster
    - Publishes a notification
  - Receiver
    - Listens for notifications
  - Observer
    - Watches a repository

Figure 2-12. Additional elements VB1861.0

Notes:



Validation fundamentals

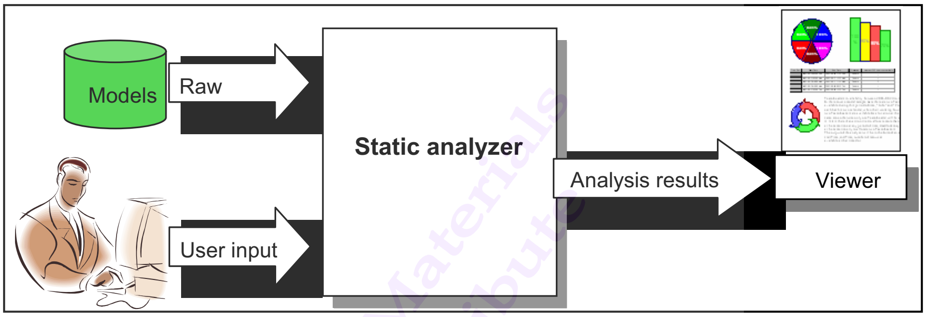
- Syntax: Model constructs are correct and valid.
  - Is the model properly constructed to provide valid results in the Modeler?
- Semantics: The meaning of the model is correct — task attributes, organizations, roles, and sequence of tasks.
  - Does the model created reflect what is occurring in the business, or what could occur in the business?
  - Is it thorough; was any data left out?
- Sense: The model is business relevant, cost (time and money) assumptions and their causes are valid.
  - Does it make sense that the model and resulting analysis show on average that it takes three weeks to process a claim when company metrics would suggest one week?
- Standards: The model adheres to the defined modeling standards — constructs and naming conventions.
  - Will the model be able to be understood by someone who was not involved with its creation?

Figure 2-13. Validation fundamentals VB1861.0

Notes:

Static analysis overview

- Gives business users important information computed from the raw data in the models:
  - Cost
  - Time
  - Performance
  - Improvement capabilities
  - Process flow validity
  - Resources leveling
  - Qualified resources to play important roles



Models

Raw

User input

Static analyzer

Analysis results

Viewer

- Inputs are raw model data and parameters entered by the user.
- Results are viewed using either a tabular or graphical viewer.
  - Results can be printed using predefined report templates.

Figure 2-14. Static analysis overview

VB1861.0

Notes:

Query overview

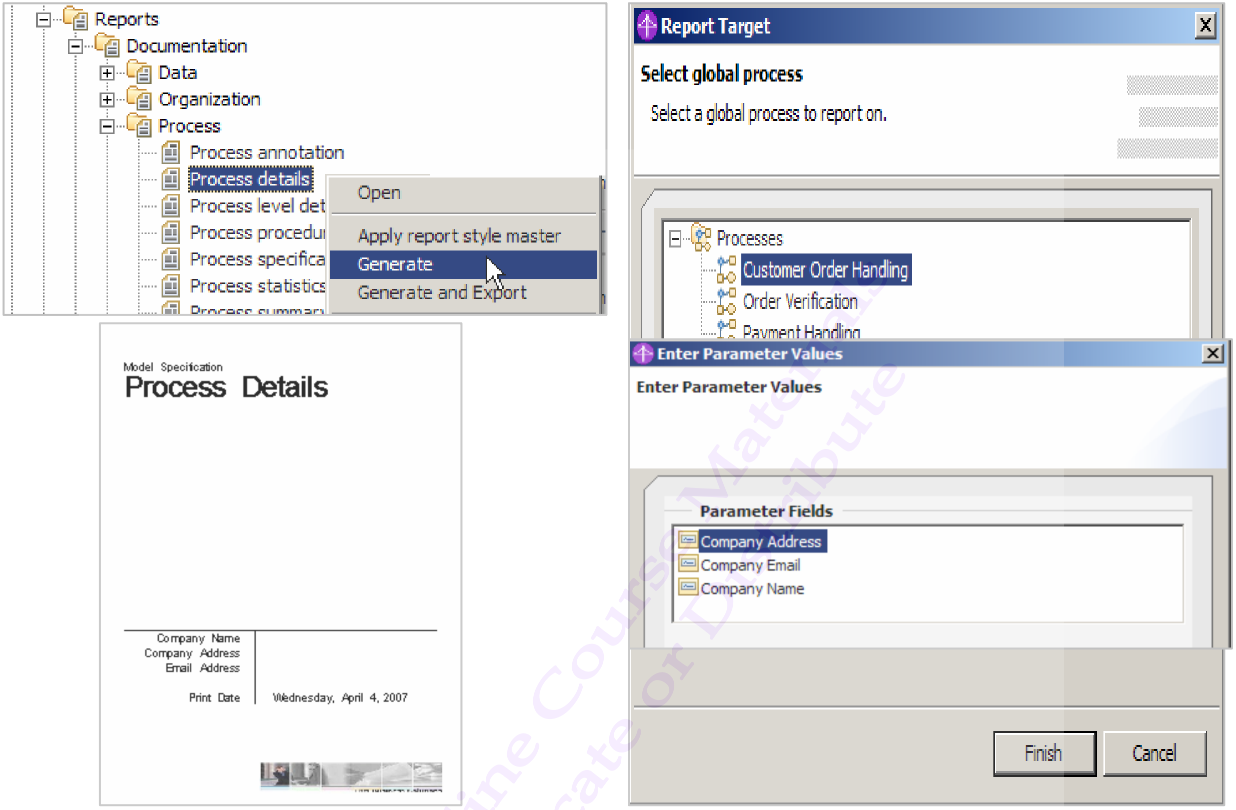
- Extract and view information on elements of the models
- Return information about model elements of one specified type
- To confirm the content of the models
- The basis for creating reports
- Use the query builder to create queries
- A variety of documentation queries are available:
  - Statistics queries
    - Return the number of elements associated with the selected model element
  - Details queries
    - Return element names, such as resources, roles, organization units, locations, and business items, that are associated with the selected element
  - Specification queries
    - Return the values contained in the specification of the selected element

Figure 2-15. Query overview

VB1861.0

Notes:

Generating reports



Select global process

Select a global process to report on.

Enter Parameter Values

Model Specification

Process Details

Company Name
Company Address
Email Address

Print Date Wednesday, April 4, 2007

Figure 2-16. Generating reports VB1861.0

Notes:

Defining standards and agreeing to best practices

- Your stakeholders will also help you define the standards and gain the agreement required to maintain best practices:
  - WebSphere Business Modeler is methodology independent, but successful modeling efforts require a level of standardization and a defined approach.
  - Process modeling standards:
    - It is necessary to define the use, creation, and implementation of the symbols, definitions, and data descriptions.

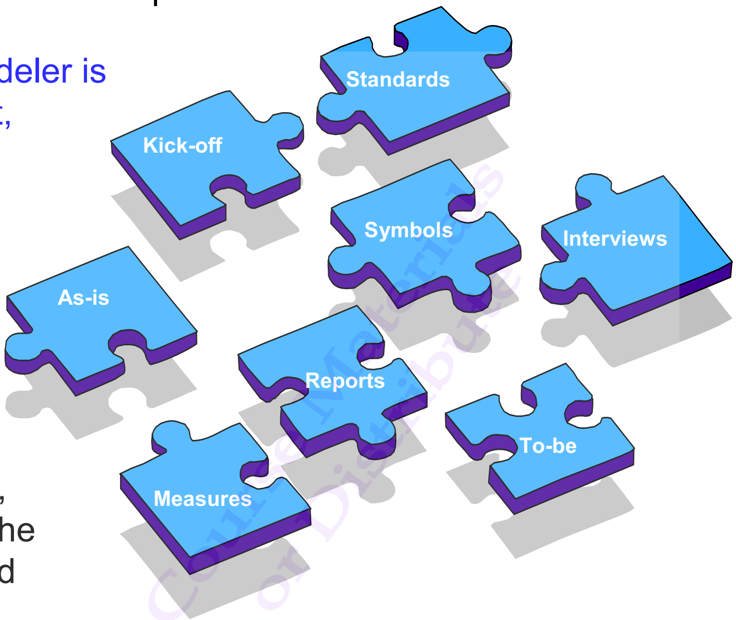
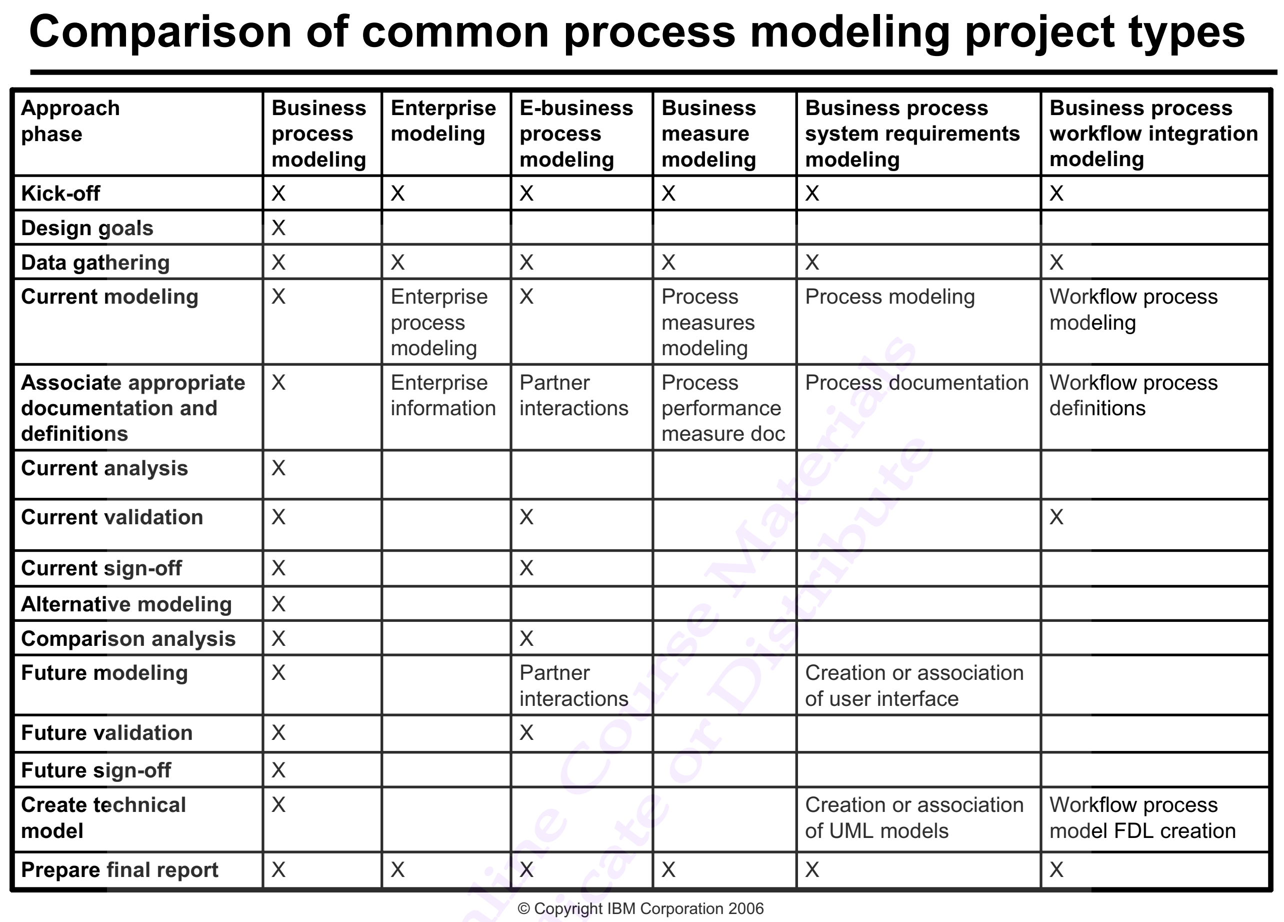


Figure 2-17. Defining standards and agreeing to best practices VB1861.0

Notes:



Comparison of common process modeling project types

Approach phase	Business process modeling	Enterprise modeling	E-business process modeling	Business measure modeling	Business process system requirements modeling	Business process workflow integration modeling
Kick-off	X	X	X	X	X	X
Design goals	X					
Data gathering	X	X	X	X	X	X
Current modeling	X	Enterprise process modeling	X	Process measures modeling	Process modeling	Workflow process modeling
Associate appropriate documentation and definitions	X	Enterprise information	Partner interactions	Process performance measure doc	Process documentation	Workflow process definitions
Current analysis	X					
Current validation	X		X			X
Current sign-off	X		X			
Alternative modeling	X					
Comparison analysis	X		X			
Future modeling	X		Partner interactions		Creation or association of user interface	
Future validation	X		X			
Future sign-off	X					
Create technical model	X				Creation or association of UML models	Workflow process model FDL creation
Prepare final report	X	X	X	X	X	X

Figure 2-18. Comparison of common process modeling project types VB1861.0

Notes:

Environments for modeling

- Single user environment
- Multi-user environment

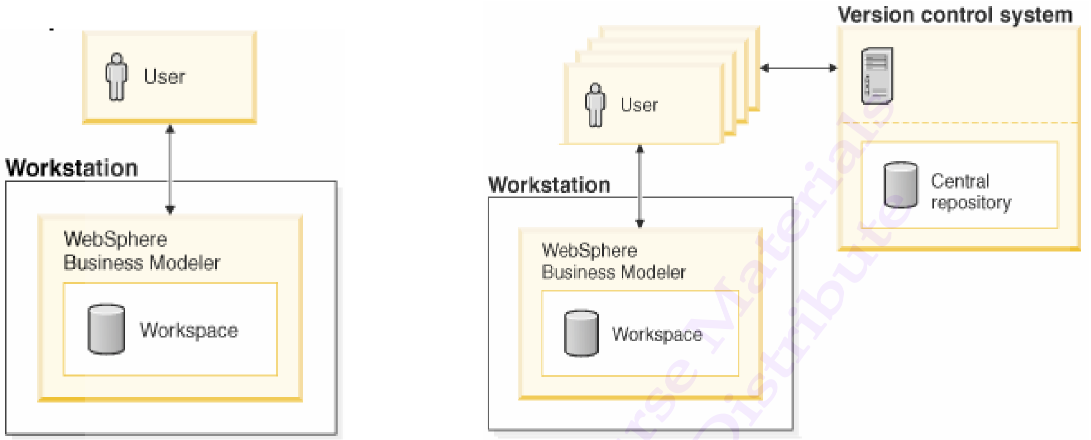


Figure 2-19. Environments for modeling VB1861.0

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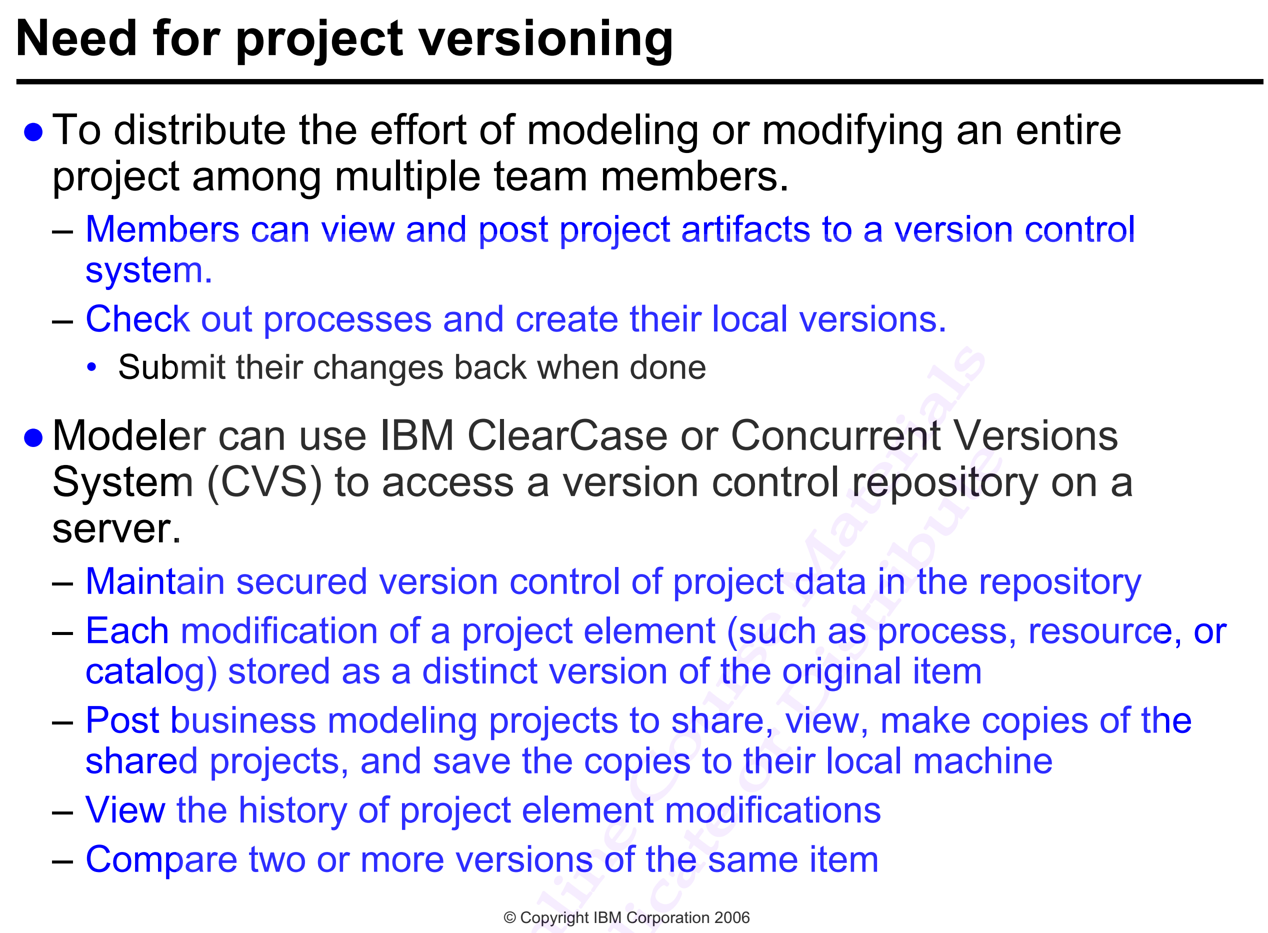
Notes:

The **single user environment** is the basic environment for authoring a model. In this environment, a single user at a time builds, stores, validates, and analyzes the model. The single user environment is ideal for small scale projects in which parallel (or concurrent) development of the model does not often occur.

The **multiuser environment** supports larger projects with several users contributing to build the business process model.

Parallel development occurs when two or more users work on the model simultaneously. The danger with parallel development in the single user environment is that data loss may occur. For example, User A edits Process 1 to add Task 1, while User B edits Process 1 and adds Task 2. In this case, Process 1 will contain Task 1 or Task 2, depending on which user did the last save.

If more than one person needs to work on the model in the single user environment, they do so by exporting and importing model projects or individual model elements. For example, User A edits the model and then exports it. User B imports the model and then works on it. If the team is using importing and exporting models to share a project, the team members must closely cooperate and coordinate to avoid overwriting each other's changes and causing data loss.



Need for project versioning

- To distribute the effort of modeling or modifying an entire project among multiple team members.
  - Members can view and post project artifacts to a version control system.
  - Check out processes and create their local versions.
    - Submit their changes back when done
- Modeler can use IBM ClearCase or Concurrent Versions System (CVS) to access a version control repository on a server.
  - Maintain secured version control of project data in the repository
  - Each modification of a project element (such as process, resource, or catalog) stored as a distinct version of the original item
  - Post business modeling projects to share, view, make copies of the shared projects, and save the copies to their local machine
  - View the history of project element modifications
  - Compare two or more versions of the same item

Figure 2-20. Need for project versioning VB1861.0

Notes:

Publishing Server

- Users may include business analysts, consultants, or process engineers.
- Reviewers may include executives, consultants, employees, partners, and even customers.
- Reviewers validate the data used to create the process model or provide feedback.
- Users make adjustments to the process based on reviewer feedback.
- Publish a single model element, a complete catalog, or the entire process model project.
- The reviewers can then comment on the updated process model or respond to comments.
- This creates an environment for continuous improvement of the process model.

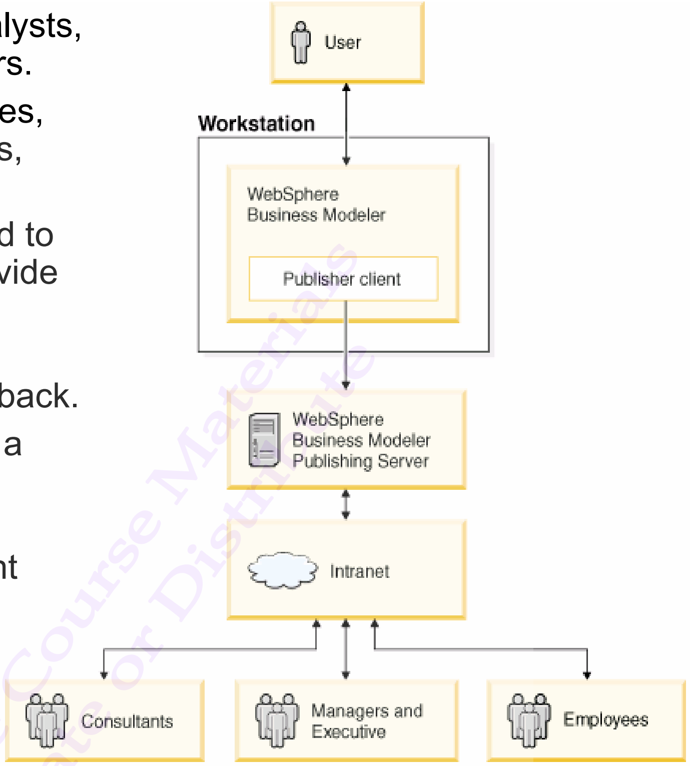


Figure 2-21. Publishing Server VB1861.0

Notes:

Modeler Help

- **Help menu**
  - Welcome
    - Complete set of support topics: what's new, tutorials, samples, hints and tips, product support, Web resources
  - Help contents
    - Eclipse help
  - Tips and tricks
    - Links to ideas and shortcuts to make modeling quicker and easier
  - Quickstart wizard
    - Another place to start a new project
  - Modeler Help
    - A place to search the help database by topic
  - Cheat sheets
    - Programmer help — Java, Eclipse
  - Software updates
    - Getting the latest product updates

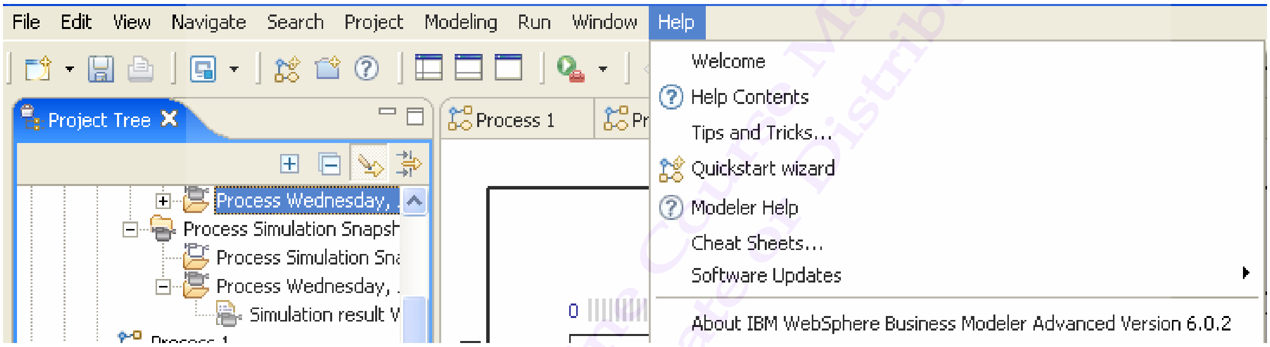


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Figure 2-22. Modeler Help VB1861.0

Notes:

Unit 3. Introduction to simulation and analysis

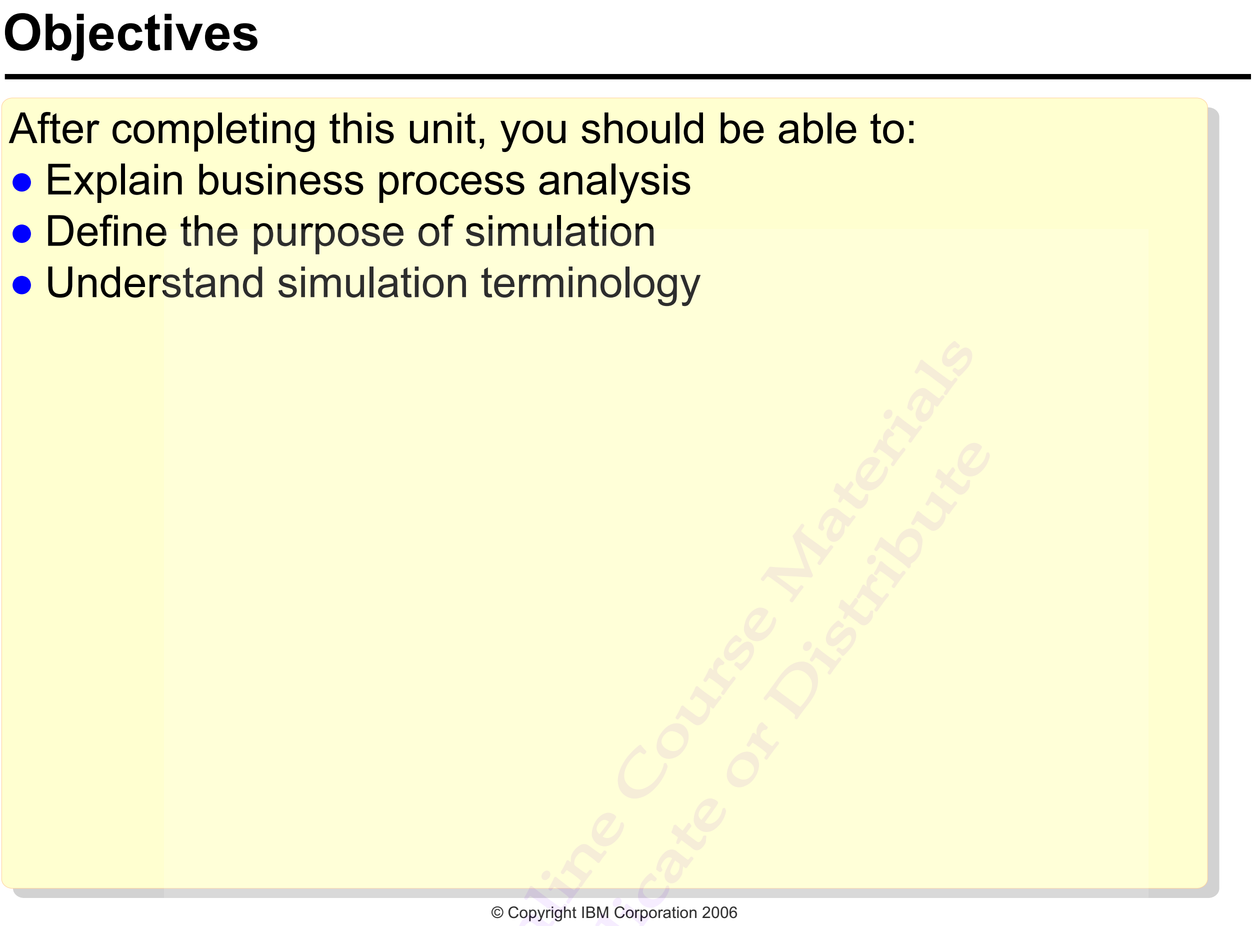
What this unit is about

This unit describes the introduction to simulation and analysis.

What you should be able to do

After completing this unit, you should be able to:

- Explain business process analysis
- Define the purpose of simulation
- Describe simulation terminology



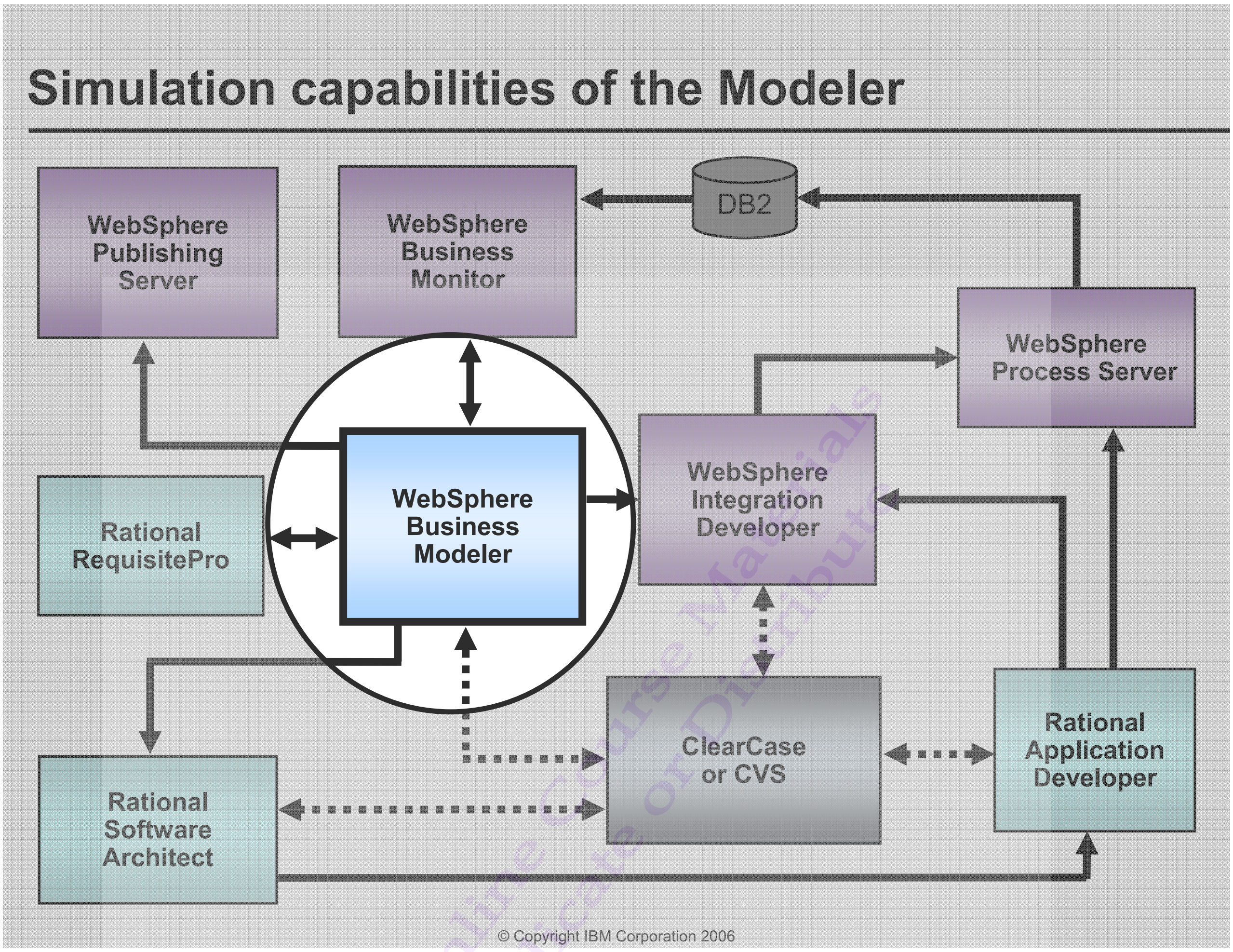
Objectives

After completing this unit, you should be able to:

- Explain business process analysis
- Define the purpose of simulation
- Understand simulation terminology

Figure 3-1. Objectives VB1861.0

Notes:



Simulation capabilities of the Modeler

WebSphere Publishing Server

WebSphere Business Monitor

DB2

WebSphere Process Server

Rational RequisitePro

WebSphere Business Modeler

WebSphere Integration Developer

ClearCase or CVS

Rational Application Developer

Rational Software Architect

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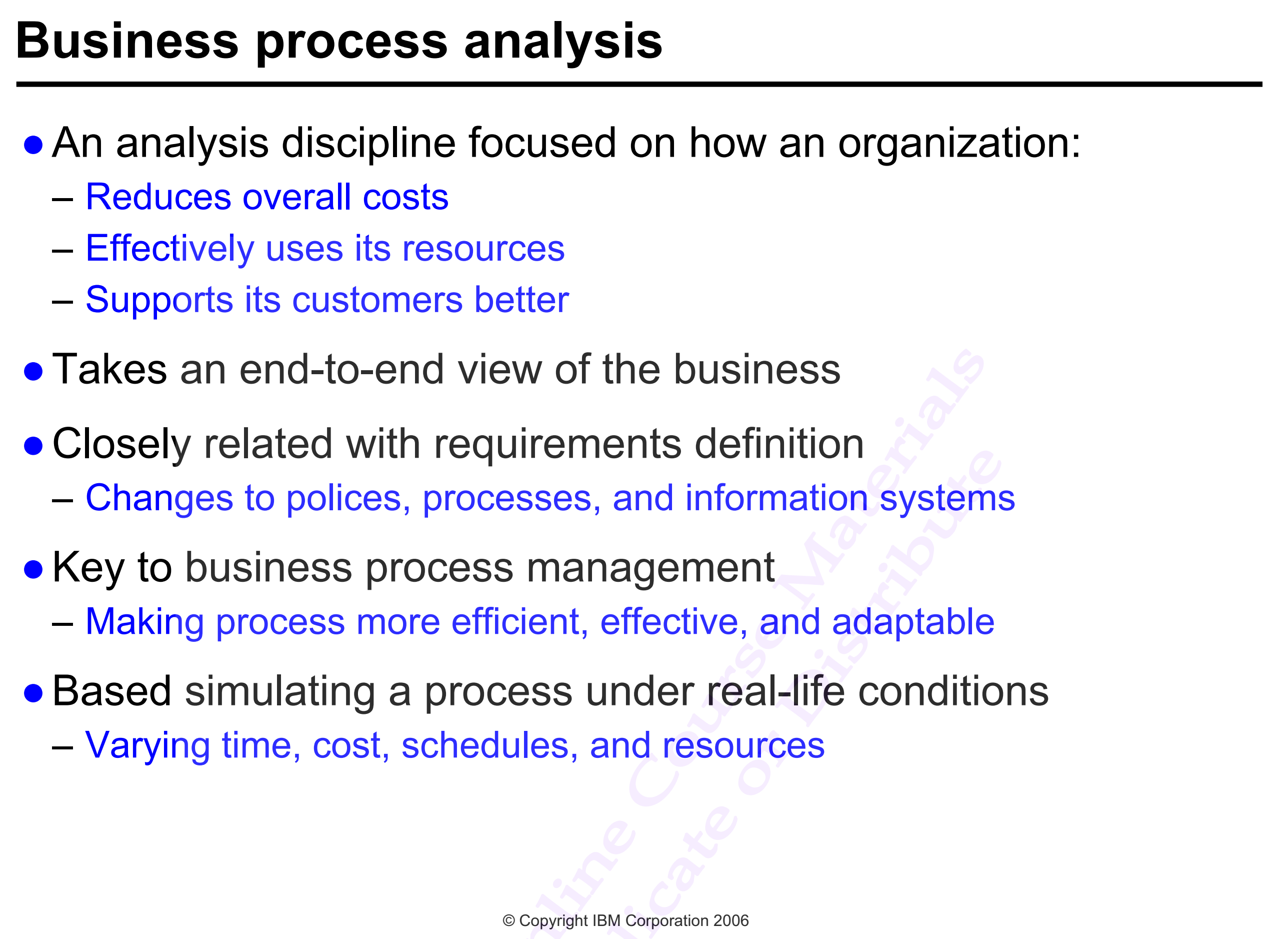
Figure 3-2. Simulation capabilities of the Modeler VB1861.0

Notes:

Legend:

- - - - - - Version control flow (dashed line)

——— Development flow (solid line)

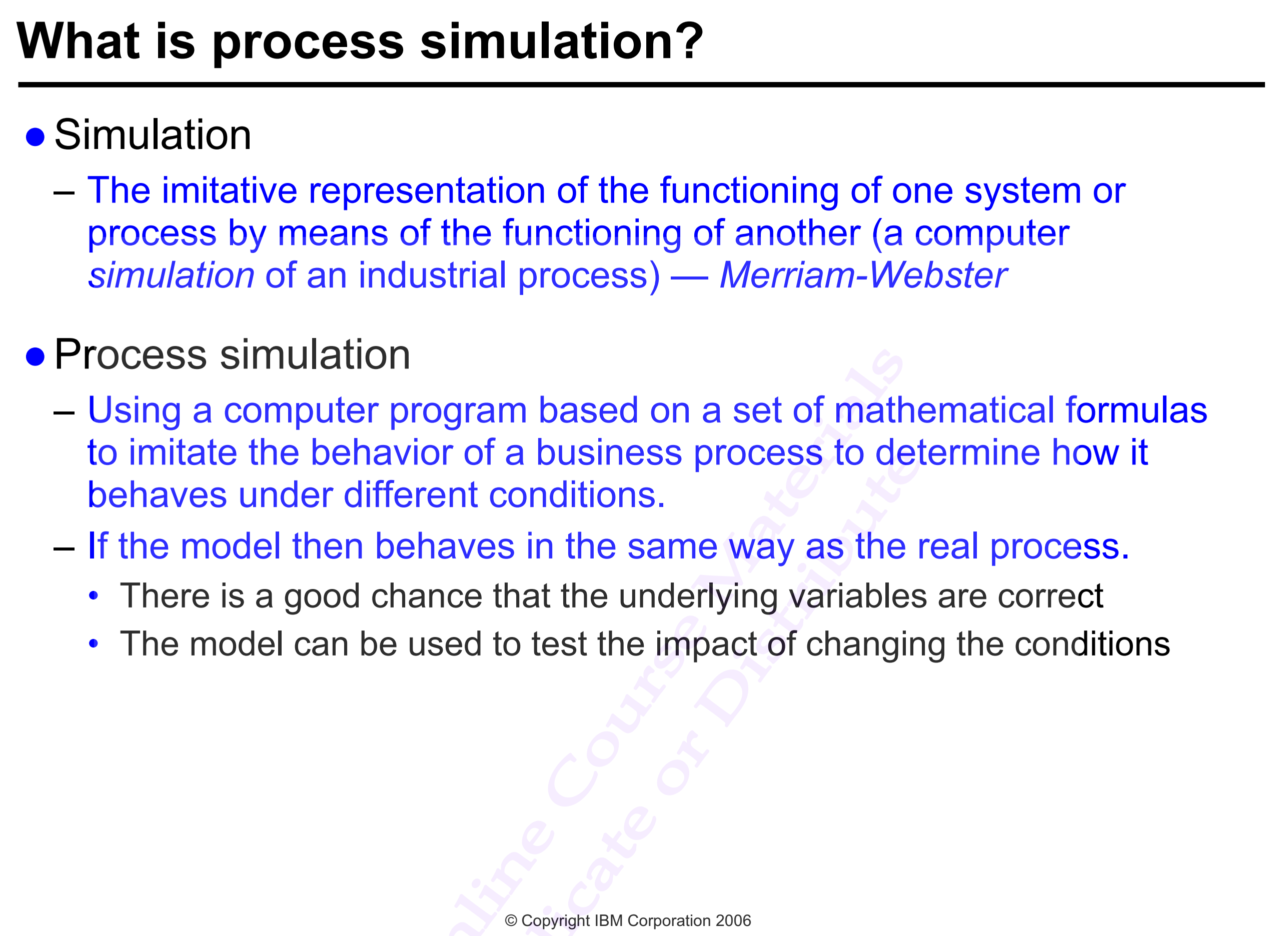


Business process analysis

- An analysis discipline focused on how an organization:
  - Reduces overall costs
  - Effectively uses its resources
  - Supports its customers better
- Takes an end-to-end view of the business
- Closely related with requirements definition
  - Changes to polices, processes, and information systems
- Key to business process management
  - Making process more efficient, effective, and adaptable
- Based simulating a process under real-life conditions
  - Varying time, cost, schedules, and resources

Figure 3-3. Business process analysis VB1861.0

Notes:



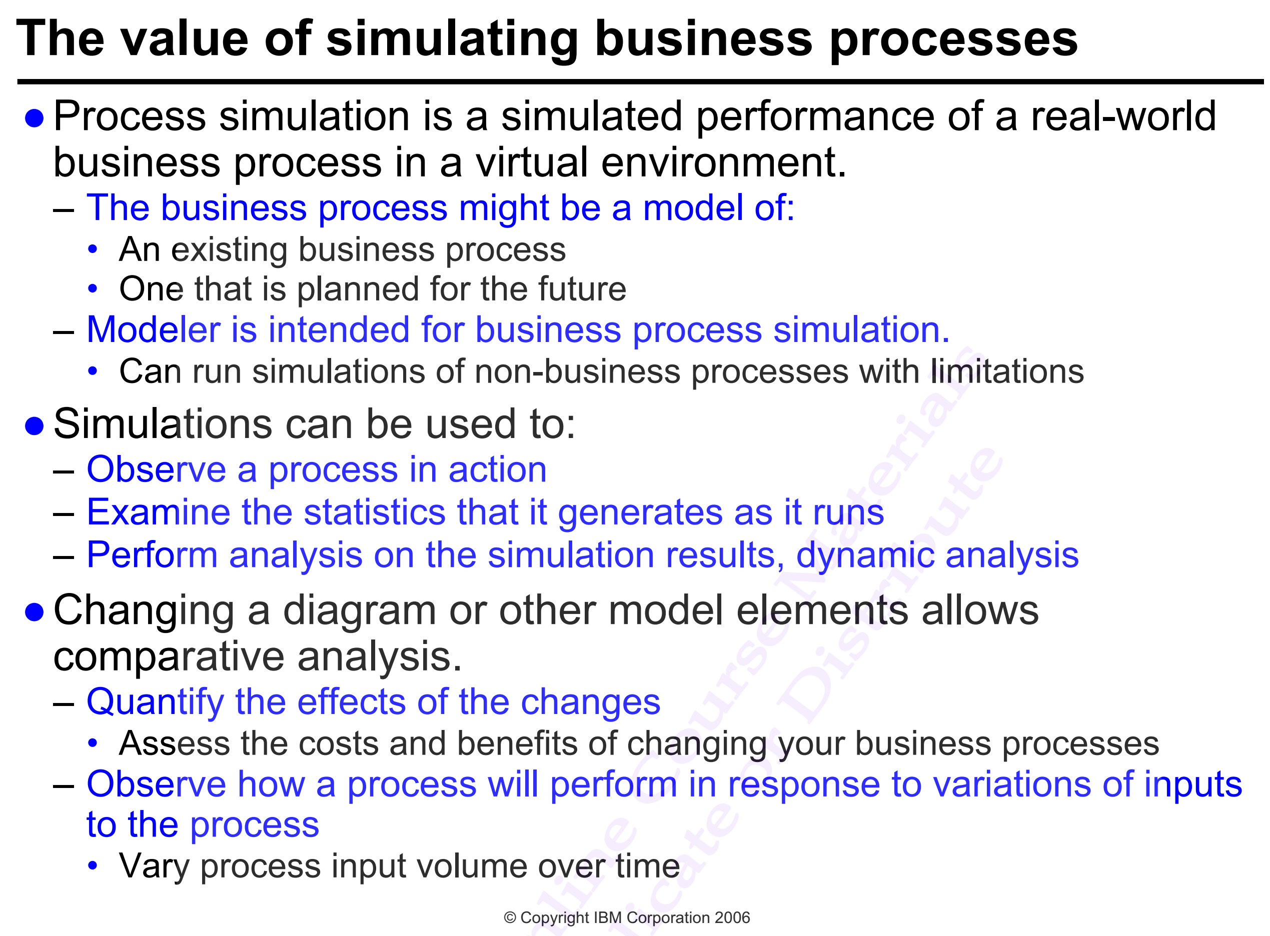
What is process simulation?

- Simulation
  - The imitative representation of the functioning of one system or process by means of the functioning of another (a computer *simulation* of an industrial process) — *Merriam-Webster*
- Process simulation
  - Using a computer program based on a set of mathematical formulas to imitate the behavior of a business process to determine how it behaves under different conditions.
  - If the model then behaves in the same way as the real process.
    - There is a good chance that the underlying variables are correct
    - The model can be used to test the impact of changing the conditions

Figure 3-4. What is process simulation?

VB1861.0

Notes:



The value of simulating business processes

- Process simulation is a simulated performance of a real-world business process in a virtual environment.
  - The business process might be a model of:
    - An existing business process
    - One that is planned for the future
  - Modeler is intended for business process simulation.
    - Can run simulations of non-business processes with limitations
- Simulations can be used to:
  - Observe a process in action
  - Examine the statistics that it generates as it runs
  - Perform analysis on the simulation results, dynamic analysis
- Changing a diagram or other model elements allows comparative analysis.
  - Quantify the effects of the changes
    - Assess the costs and benefits of changing your business processes
  - Observe how a process will perform in response to variations of inputs to the process
    - Vary process input volume over time

Figure 3-5. The value of simulating business processes VB1861.0

Notes:

Simulation terminology

- Simulation snapshot
  - A record of the model that will be simulated
- Simulation profile
  - A record of the model plus the simulation attributes
- Statistics and results
  - The information that comes out of the simulation
- Probabilities or expressions
  - The way decisions are handled during simulation
- Tokens
  - Represent units of work passing through the process
- Process instances
  - Each execution of a process in a simulation
- Process cases
  - Each path through a process
- Random number generation
  - The introduction real-life variability into a simulation

Figure 3-6. Simulation terminology VB1861.0

Notes:

Simulation snapshots

- A record of the complete process model at the moment when you simulated the process
  - A copy of all the elements in the project that the process uses
    - Such as business items, resources, and global tasks
- Need to create multiple snapshots for each set of changes to compare the effects of those changes
- Elements created by a snapshot:
  - Simulation snapshot settings
  - Simulation profile
- Once created, the changes to the original model will not be reflect in the snapshot model
  - To include the changes, a new snapshot needs to be created

Figure 3-7. Simulation snapshots VB1861.0

Notes:

Simulation profiles

- Copy of a process model augmented with simulation attributes used to run the simulation
  - Based on the process model at the time the snapshot was created
- Includes settings, such as token creation settings
  - Those that apply only to the simulation profile behavior during simulation
- Includes copies of settings, such as cost, revenue, duration, and resource requirements
  - Those that can be overridden in the simulation profile
- Multiple simulation profiles can be created for a single simulation snapshot
  - Compare the results of your process in different business conditions
    - For example, increase in volume
- Can add breakpoints and interrupts to a simulation profile to cause a process to pause in the middle of a simulation run
  - Breakpoint pauses the simulation run when that activity is activated by an incoming token
  - Interrupt pauses the simulation run when a specified condition occurs

Figure 3-8. Simulation profiles VB1861.0

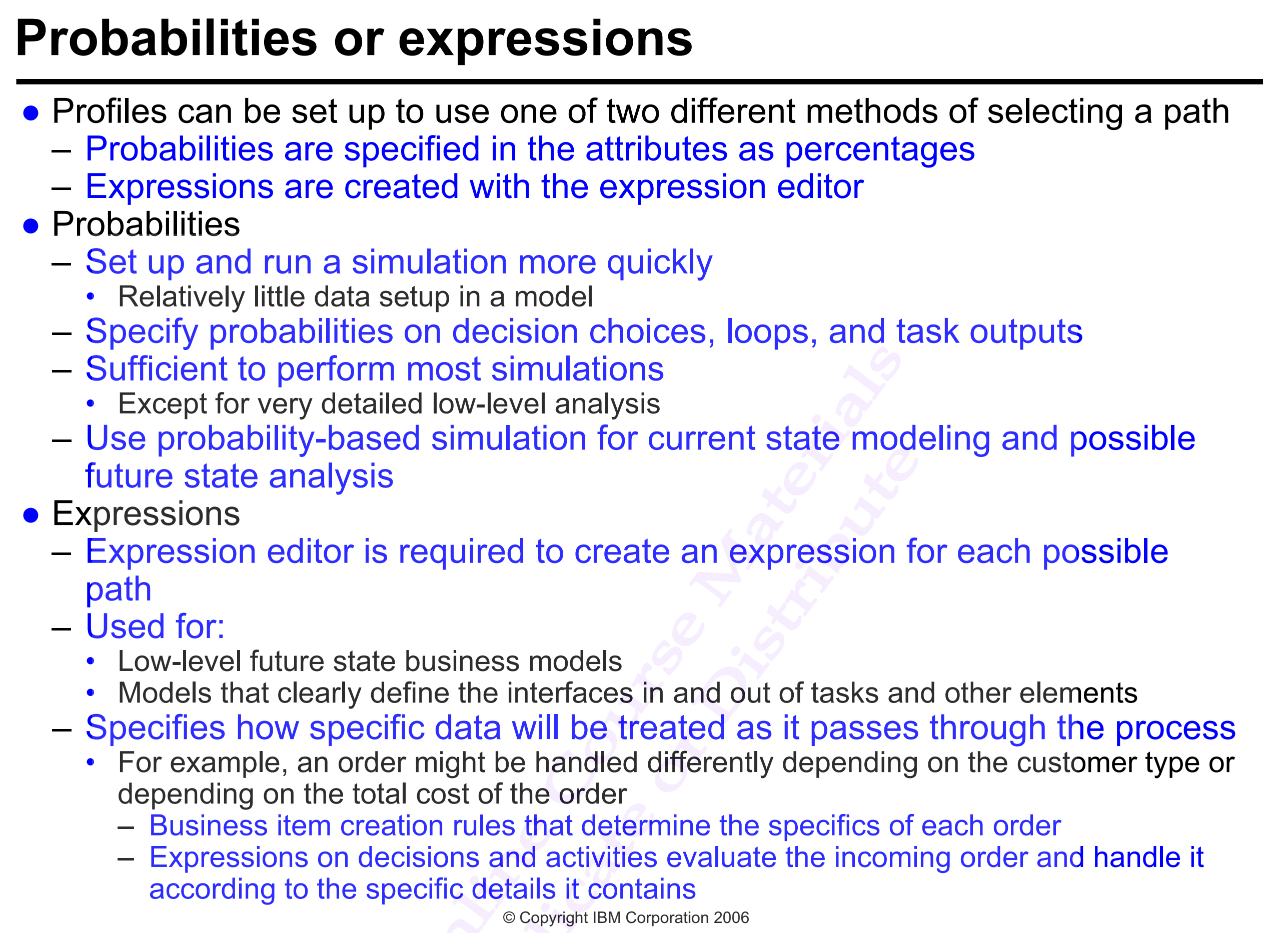
Notes:

Statistics and results

- Simulations provide two kinds of information about processes:
  - Simulation statistics are generated while the simulation is running.
  - Simulation results are compiled when the simulation has completed.
  - You can enable or disable the collection of statistics and results.
    - Set in the simulation control panel
- Simulation statistics are details about the instances of processes, tasks, and connections
    - The simulation control panel displays simulation statistics on the Processes, Tasks, and Connections tabs
    - Constantly updated while the simulation is in progress
    - Choose to display either
      - Statistics for individual process instances
      - Collected statistics based on all process instances
- Simulation results are sets of data recorded during each simulation run, and used in dynamic analyses
    - Results are stored in a database
    - A results node is added to the Project Tree as a child of the simulation profile
      - Each run produces its own simulation results node.

Figure 3-9. Statistics and results VB1861.0

Notes:



Probabilities or expressions

- Profiles can be set up to use one of two different methods of selecting a path
  - Probabilities are specified in the attributes as percentages
  - Expressions are created with the expression editor
- Probabilities
  - Set up and run a simulation more quickly
    - Relatively little data setup in a model
  - Specify probabilities on decision choices, loops, and task outputs
  - Sufficient to perform most simulations
    - Except for very detailed low-level analysis
  - Use probability-based simulation for current state modeling and possible future state analysis
- Expressions
  - Expression editor is required to create an expression for each possible path
  - Used for:
    - Low-level future state business models
    - Models that clearly define the interfaces in and out of tasks and other elements
  - Specifies how specific data will be treated as it passes through the process
    - For example, an order might be handled differently depending on the customer type or depending on the total cost of the order
      - Business item creation rules that determine the specifics of each order
      - Expressions on decisions and activities evaluate the incoming order and handle it according to the specific details it contains

Figure 3-10. Probabilities or expressions VB1861.0

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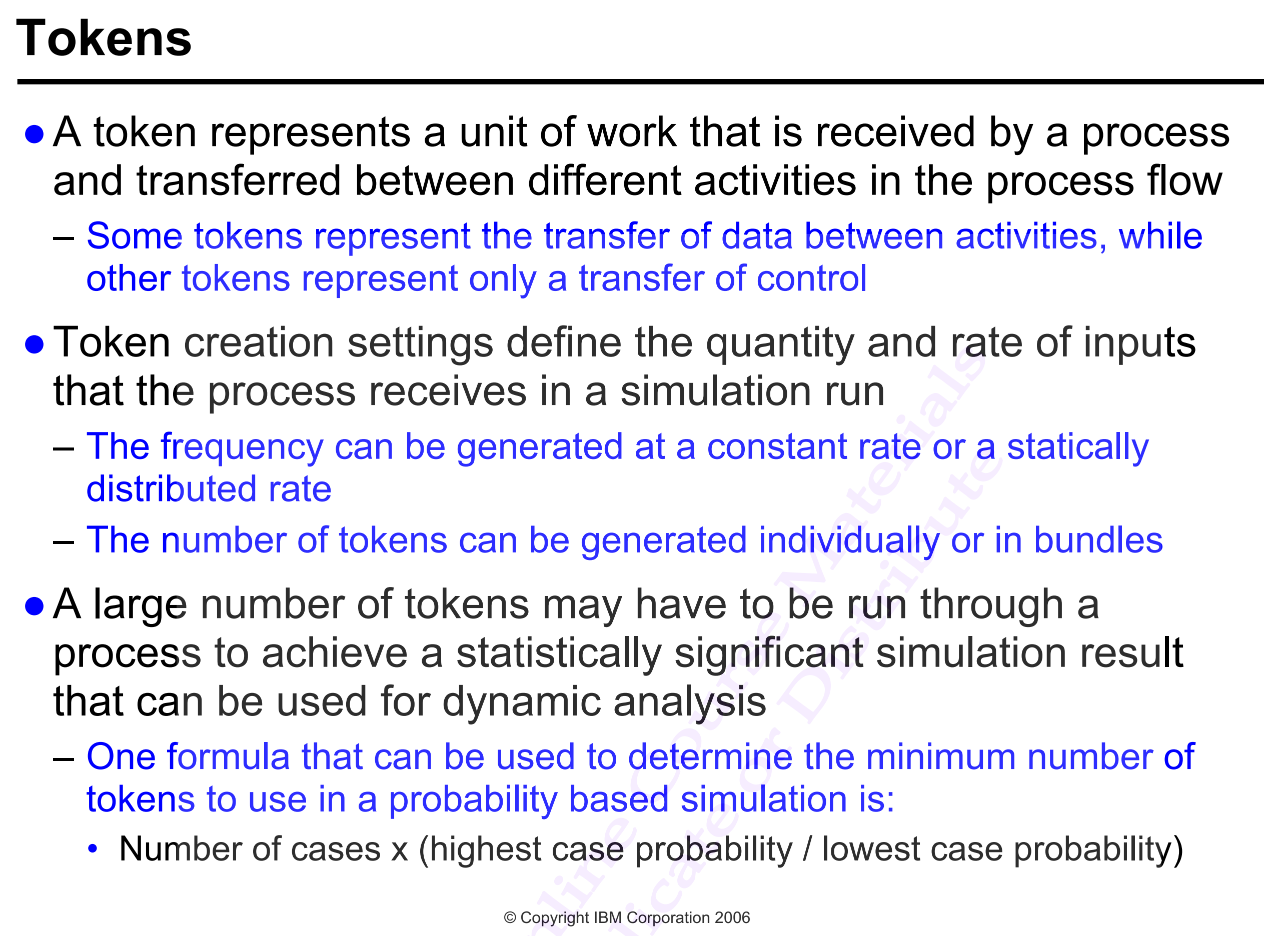
Notes:

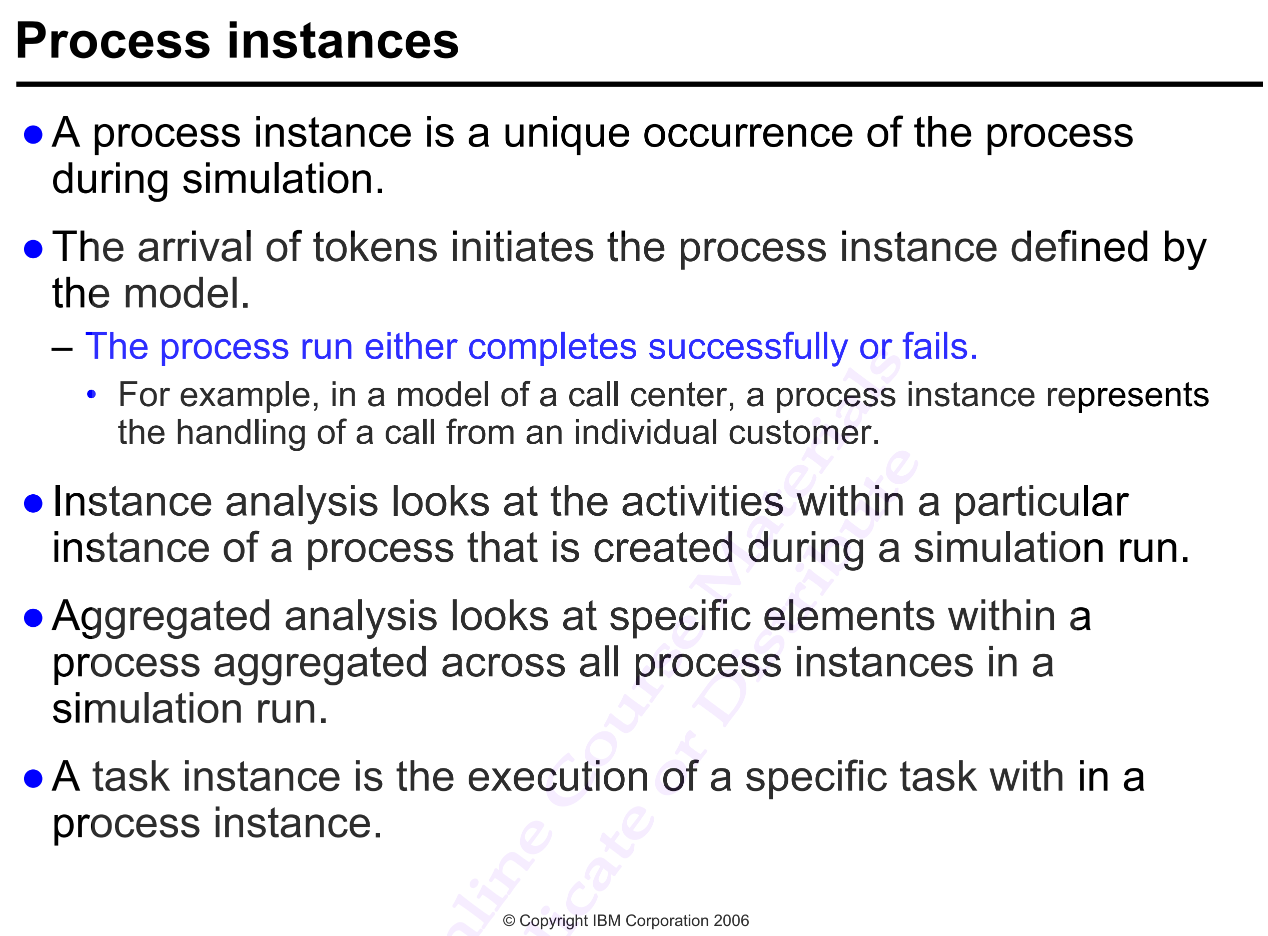


Tokens

- A token represents a unit of work that is received by a process and transferred between different activities in the process flow
  - Some tokens represent the transfer of data between activities, while other tokens represent only a transfer of control
- Token creation settings define the quantity and rate of inputs that the process receives in a simulation run
  - The frequency can be generated at a constant rate or a statically distributed rate
  - The number of tokens can be generated individually or in bundles
- A large number of tokens may have to be run through a process to achieve a statistically significant simulation result that can be used for dynamic analysis
  - One formula that can be used to determine the minimum number of tokens to use in a probability based simulation is:
    - Number of cases x (highest case probability / lowest case probability)

Figure 3-11. Tokens VB1861.0

Notes:



Process instances

- A process instance is a unique occurrence of the process during simulation.
- The arrival of tokens initiates the process instance defined by the model.
  - The process run either completes successfully or fails.
    - For example, in a model of a call center, a process instance represents the handling of a call from an individual customer.
- Instance analysis looks at the activities within a particular instance of a process that is created during a simulation run.
- Aggregated analysis looks at specific elements within a process aggregated across all process instances in a simulation run.
- A task instance is the execution of a specific task with in a process instance.

Figure 3-12. Process instances VB1861.0

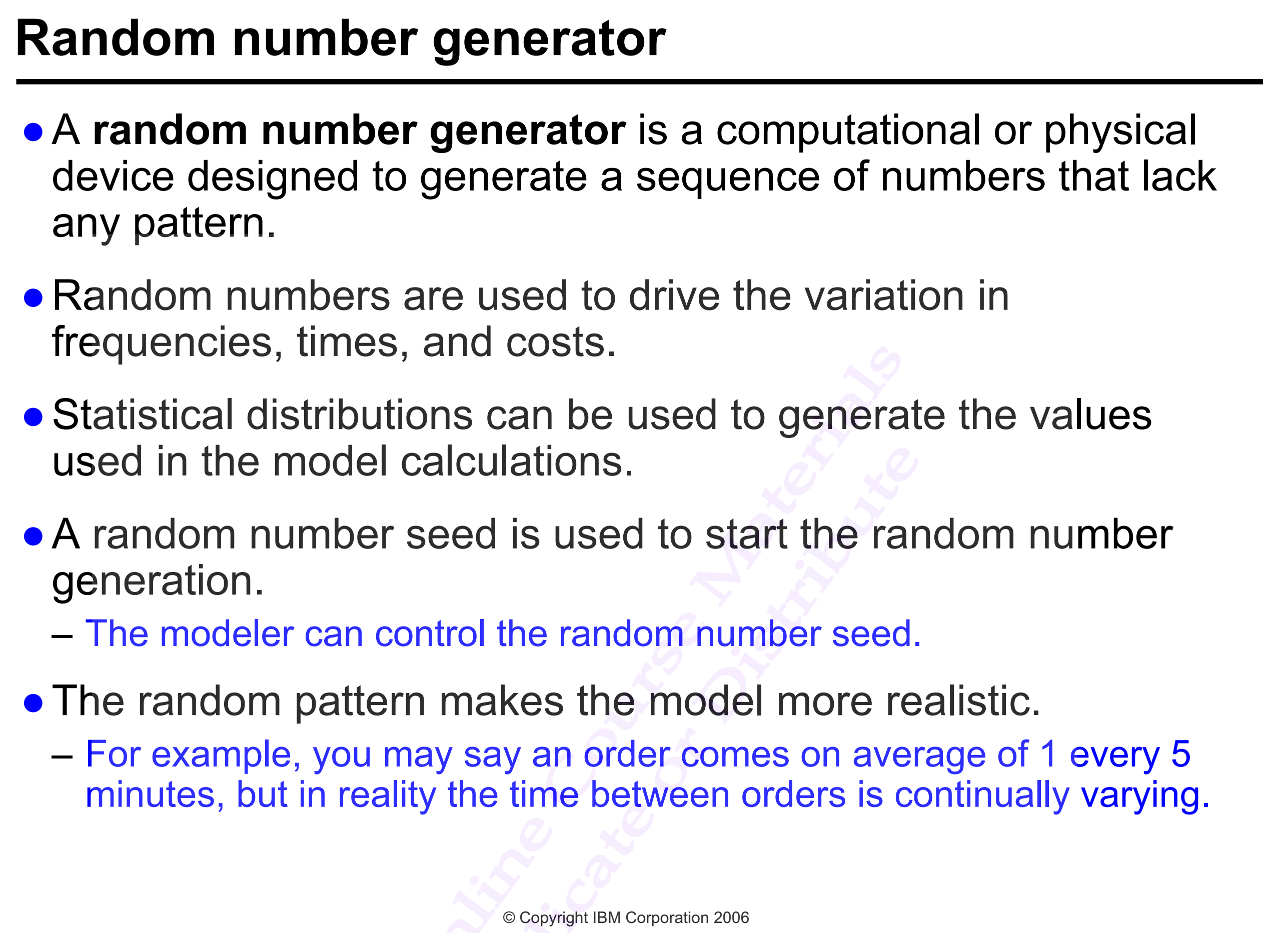
Notes:

Process cases

- A process case is a path a process instance can take, in which units of work follow a particular pattern of connections and activities through a branching process flow.
  - The path followed during simulation is determined by probabilities or expressions.
- Cases include both the main paths and all the exception paths.
- The greater the number of cases, the larger number of tokens that need to be generated for a statically significant result.
- Analyzing the process cases helps identify the variations in performance between different patterns of process flow.
  - Individual cases may have a significant effect on the overall process.

Figure 3-13. Process cases VB1861.0

Notes:



Random number generator

- A **random number generator** is a computational or physical device designed to generate a sequence of numbers that lack any pattern.
- Random numbers are used to drive the variation in frequencies, times, and costs.
- Statistical distributions can be used to generate the values used in the model calculations.
- A random number seed is used to start the random number generation.
  - The modeler can control the random number seed.
- The random pattern makes the model more realistic.
  - For example, you may say an order comes on average of 1 every 5 minutes, but in reality the time between orders is continually varying.

Figure 3-14. Random number generator VB1861.0

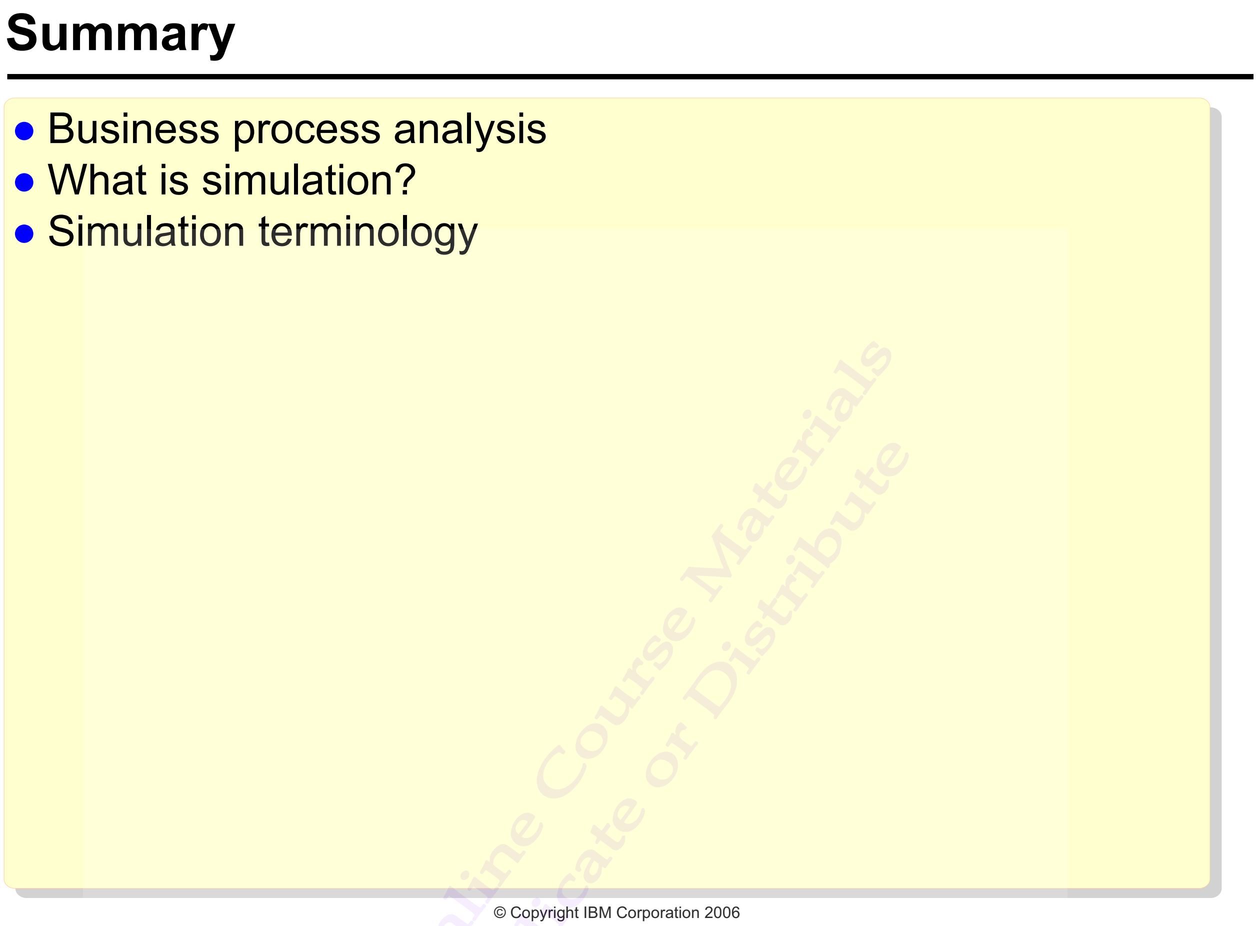
Notes:

Random number seed

- The random number seed is the starting point for a series of numbers.
  - This setting defines a random number, which determines a fixed starting point for the sequence of random values that are used in a simulation.
    - Setting a random number seed other than 0 makes it possible to exactly reproduce a simulation run for each simulation with a identical profile.
  - Setting a value of 0 causes the system to generate the random number seed.
    - This means that multiple runs of an identical profile may result in different simulated behavior because random decisions are made differently from run to run.
- When to use zero:
  - When trying to understand how a process behaves under normal conditions
  - Each time it runs there are slight statistical variations which is very realistic
  - Use to understand the effect of variations on the performance of a process
- When to use a fixed number:
  - When trying to compare two different processes under similar conditions
  - Used to hold the statistical variation constant while comparing two processes
- When to use multiple fixed numbers:
  - When trying to compare two different processes under varying statistical conditions

Figure 3-15. Random number seed VB1861.0

Notes:



Summary

- Business process analysis
- What is simulation?
- Simulation terminology

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Figure 3-16. Summary VB1861.0

Notes:

Unit 4. Setting up and running simulations

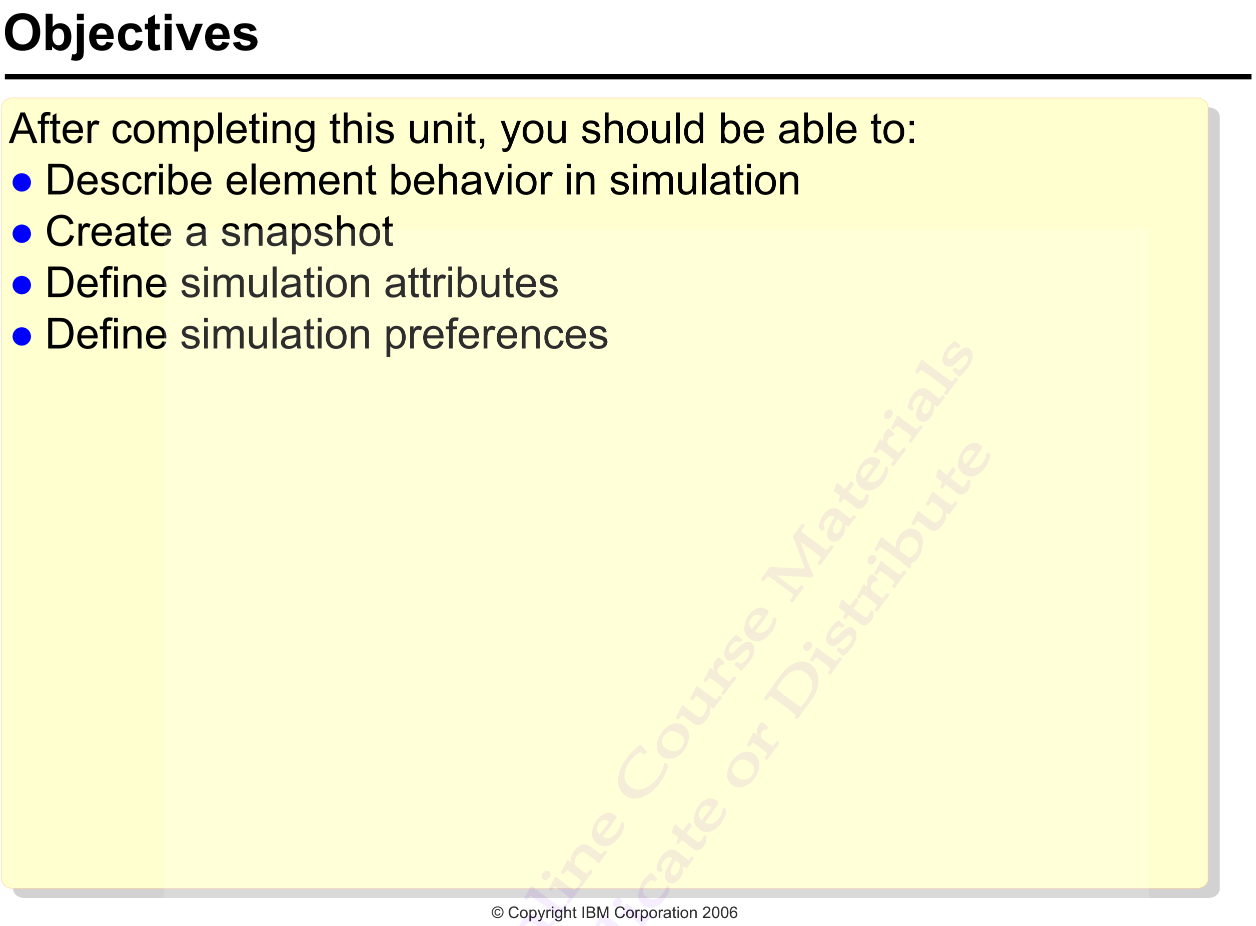
What this unit is about

This unit describes the setting up and running of simulations.

What you should be able to do

After completing this unit, you should be able to:

- Describe element behavior in simulation
- Create a snapshot
- Define simulation attributes
- Define simulation preferences



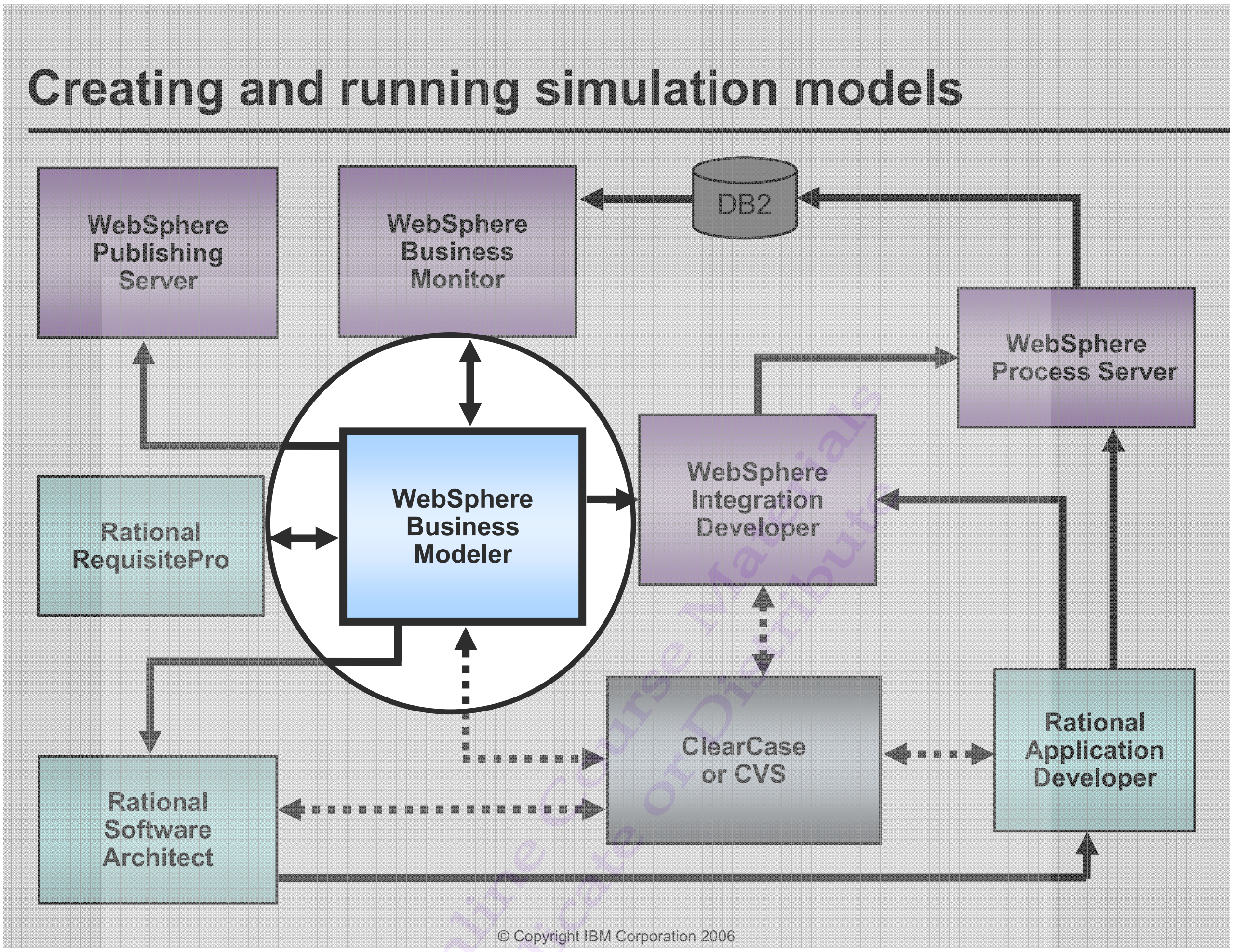
Objectives

After completing this unit, you should be able to:

- Describe element behavior in simulation
- Create a snapshot
- Define simulation attributes
- Define simulation preferences

Figure 4-1. Objectives VB1861.0

Notes:



Creating and running simulation models

WebSphere Publishing Server

WebSphere Business Monitor

DB2

WebSphere Process Server

Rational RequisitePro

WebSphere Business Modeler

WebSphere Integration Developer

ClearCase or CVS

Rational Application Developer

Rational Software Architect

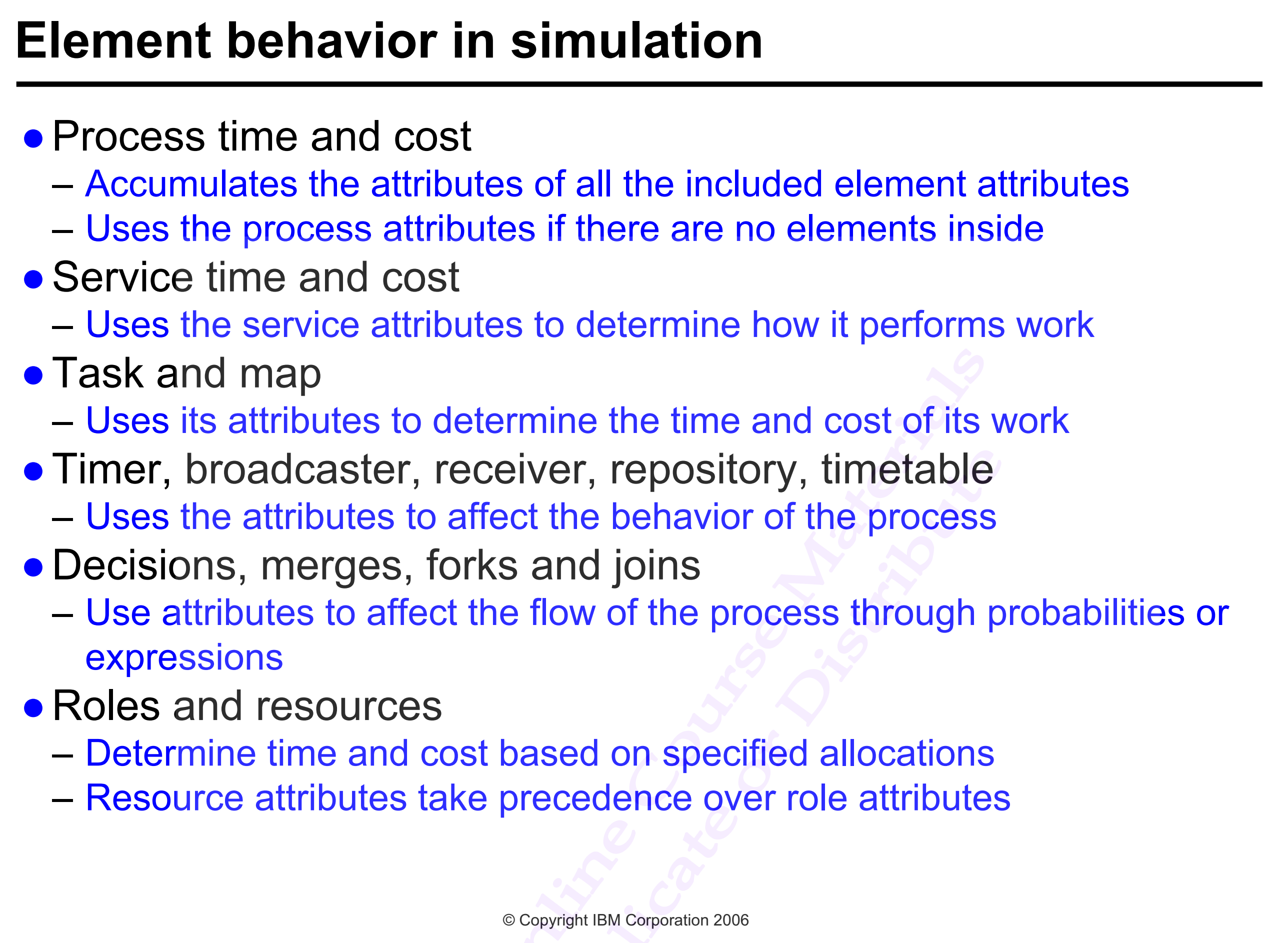
Figure 4-2. Creating and running simulation models VB1861.0

Notes:

Legend:

- - - - - - Version control flow (dashed line)

——— Development flow (solid line)



Element behavior in simulation

- Process time and cost
  - Accumulates the attributes of all the included element attributes
  - Uses the process attributes if there are no elements inside
- Service time and cost
  - Uses the service attributes to determine how it performs work
- Task and map
  - Uses its attributes to determine the time and cost of its work
- Timer, broadcaster, receiver, repository, timetable
  - Uses the attributes to affect the behavior of the process
- Decisions, merges, forks and joins
  - Use attributes to affect the flow of the process through probabilities or expressions
- Roles and resources
  - Determine time and cost based on specified allocations
  - Resource attributes take precedence over role attributes

Figure 4-3. Element behavior in simulation

VB1861.0

Notes:

Role and resource behavior in simulations

- Costs for resources and roles
  - If you define costs for both resources and roles, the resource cost takes priority.
    - Role cost is used only if no other cost is associated with the resource.
  - For a process containing an activity that has a requirement for a role.
    - The resource cost of the activity is based on the cost of the qualified resource that is allocated to the activity.
- Resource and role allocations
  - There are no rules to govern the role or resource allocation for simulations.
  - If a process instance ends before an activity role or resource allocation time is complete, the roles or resources are de-allocated from the activity and can be allocated to another activity.
  - A role or resource allocation may be split into multiple intervals, if the allocated role or resource is not continuously available for the entire duration of the resource requirement.

Figure 4-4. Role and resource behavior in simulations VB1861.0

Notes:

For example, if the customer service role has a cost of $25 an hour but the individual resource that is assigned to the activity, John Doe, has a cost of $22 an hour, the resource cost will be based on $22 an hour. If no cost is defined for the allocated resource, the role cost is used to determine the activity resource cost.

The following information refers to resources, but applies equally to roles:

> There are no rules to govern the resource allocation for simulations.
>
> The process can use any of the resources that you have made available in the resource pool for the process.
>
> If more resources are available than are required to complete a particular activity, the simulation randomly chooses adequate resources to meet the requirement.
>
> This can produce variations in the cost of completing the activity, if the available resources have different costs.
>
> If a process instance ends before an activity resource allocation time is complete, the resource is deallocated from the activity and can be allocated to another activity.

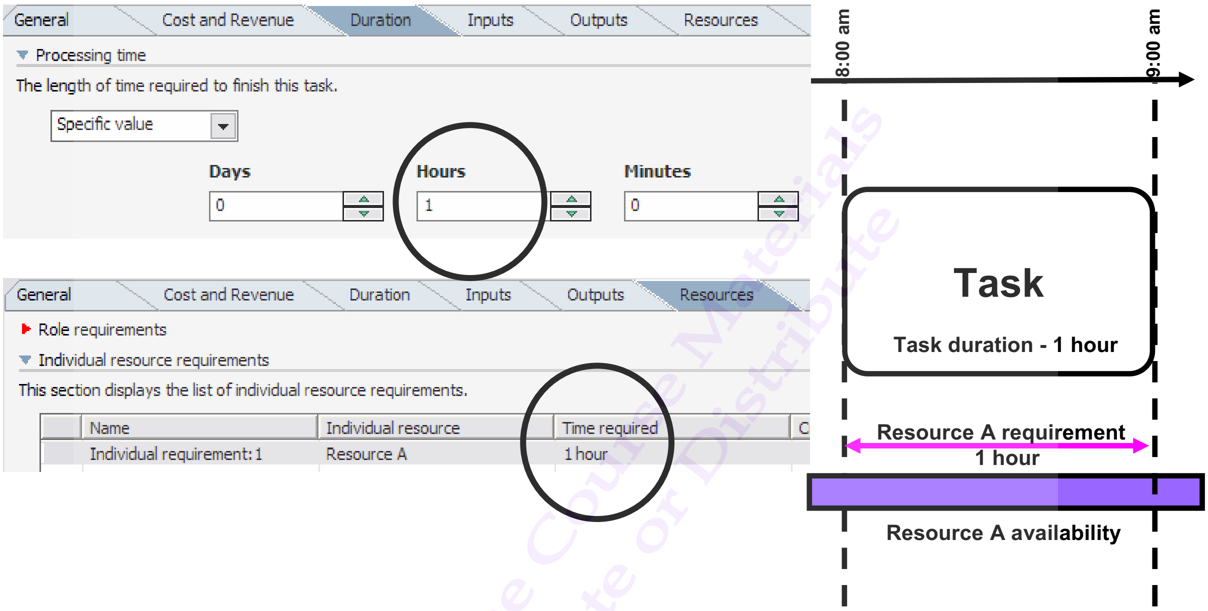
Resource allocations are recorded for the complete period of the resource requirement and incur their full costs.

A resource allocation may be split into multiple intervals, if the allocated resource is not continuously available for the entire duration of the resource requirement.

If a resource assigned to the activity is not continuously available for the duration of the activity, it is possible that the resource will remain allocated to the activity even after the activity completes.

Task duration and resource requirements

- Duration is used to determine cycle time
- Resource time required is used to determine cost



Processing time

The length of time required to finish this task.

Specific value

Days	Hours	Minutes
0	1	0

Role requirements

Individual resource requirements

This section displays the list of individual resource requirements.

Name	Individual resource	Time required	C
Individual requirement:1	Resource A	1 hour	

Figure 4-5. Task duration and resource requirements VB1861.0

Notes:

Single resource

- Task behavior with simulation preference set to “Yes”
  - Wait for resources’ end time to complete a task

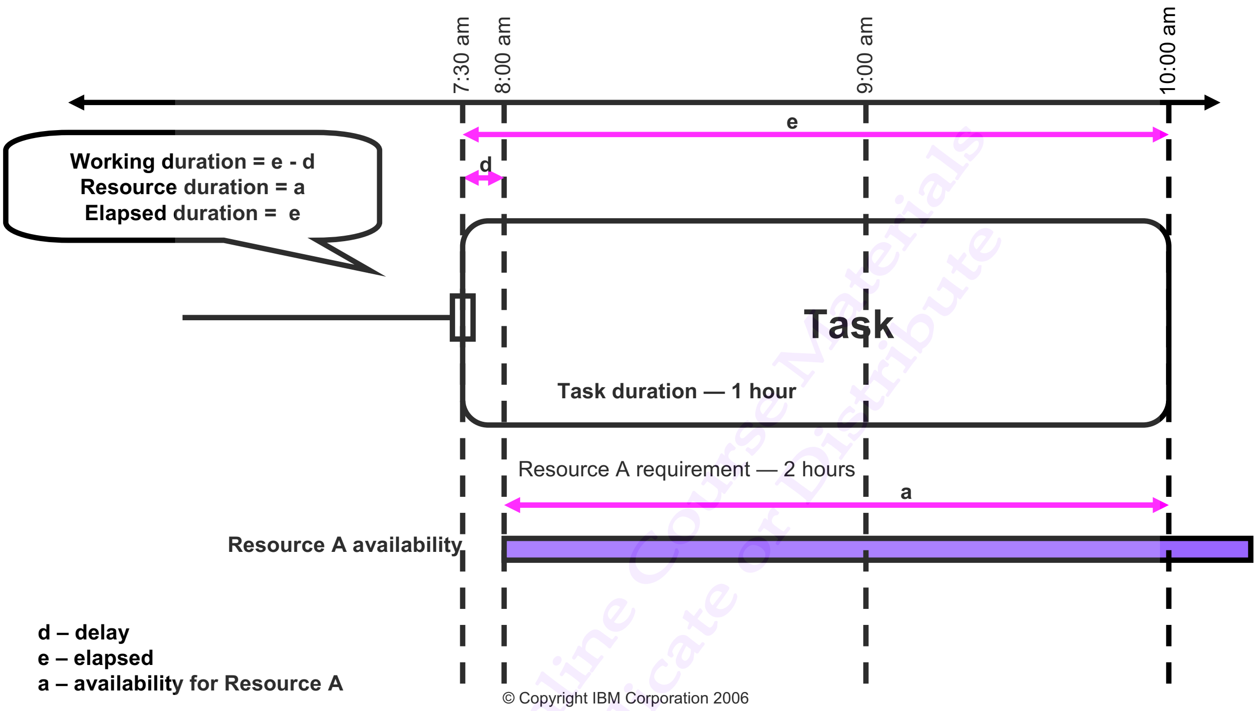
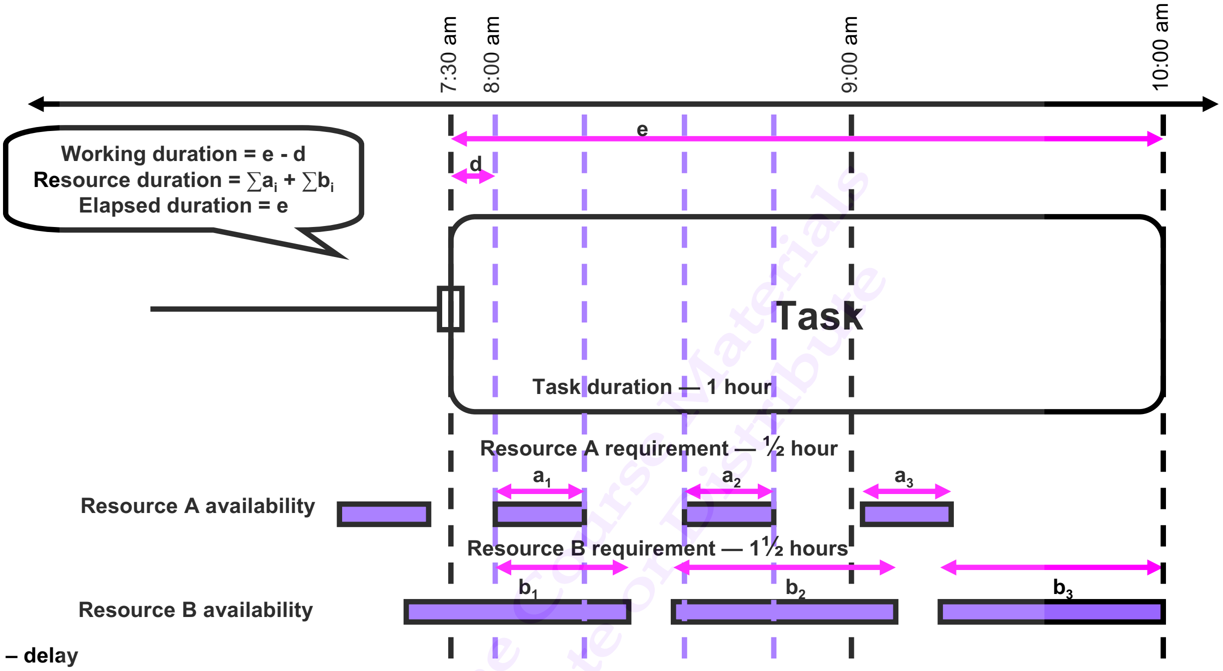


Figure 4-6. Single resource VB1861.0

Notes:

Multiple resources (1 of 2)

- Task behavior with simulation preference set to “Yes”
  - Wait for resources’ end time to complete a task



Working duration = e - d
Resource duration = $\sum a_i + \sum b_i$
Elapsed duration = e

d – delay
e – elapsed
a – availability for Resource A
b – availability for Resource B

Figure 4-7. Multiple resources (1 of 2) VB1861.0

Notes:

Resource A is available in 15-minute chunks, for a total of 1 hour.

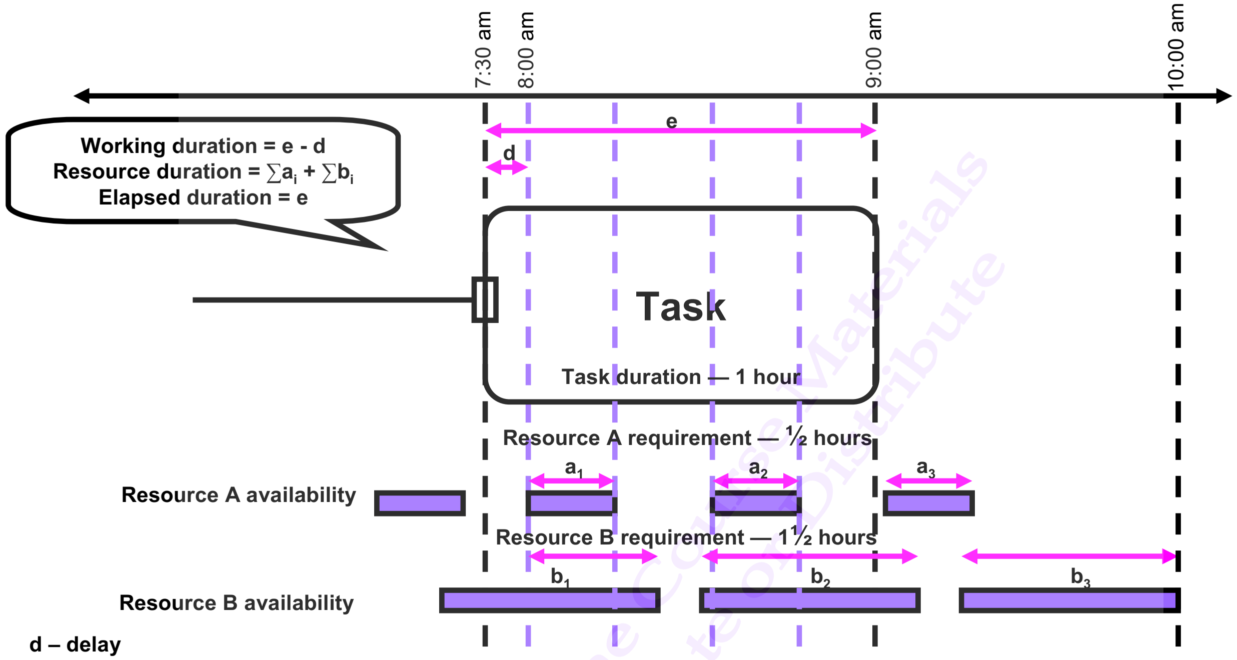
Resource B is available in 40-minute chunks, for a total of 1 hour.

The total resource time is 2 hours, which is the time it takes to do the task.

Note that the total time to complete the task could be greater than 2 hours.

Multiple resources (2 of 2)

- Task behavior with simulation preference set to “No”
  - Wait for resources’ end time to complete a task



Working duration = e - d
Resource duration = $\sum a_i + \sum b_i$
Elapsed duration = e

d – delay
e – elapsed
a – availability for Resource A
b – availability for Resource B

Figure 4-8. Multiple resources (2 of 2) VB1861.0

Notes:

Resource A is available in 15-minute chunks, for a total of 1 hour.

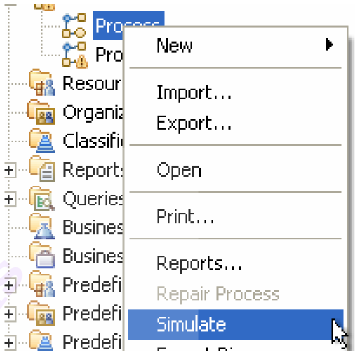
Resource B is available in 40-minute chunks, for a total of 1 hour.

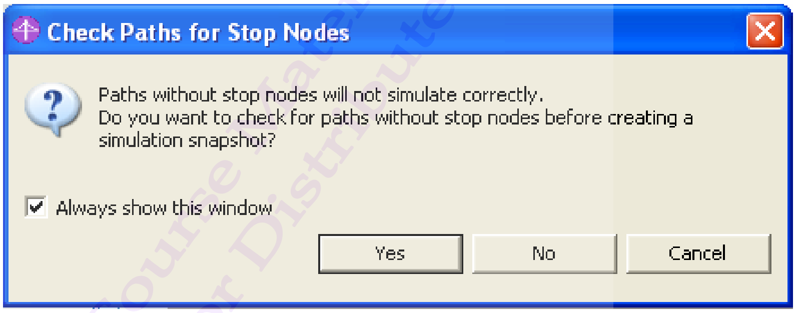
The total resource time is 2 hours, which it the time it takes to do the task.

Note that the total time to complete the task could be greater than 2 hours.

Creating a simulation snapshot

- To simulate a process, you must create a simulation snapshot.
  - Creating a simulation snapshot creates an initial simulation profile.
- The snapshot generator asks to check the stop nodes.
  - Every process must end with a stop node.
- A new simulation snapshot appears in the Project Tree.
  - Its name is made up of:
    - The name of the originating process
    - The words "simulation snapshot"
    - A timestamp
  - The simulation snapshot contains the simulation snapshot settings and an initial simulation profile.
- Fix critical errors before creating a snapshot.





Paths without stop nodes will not simulate correctly.
Do you want to check for paths without stop nodes before creating a simulation snapshot?

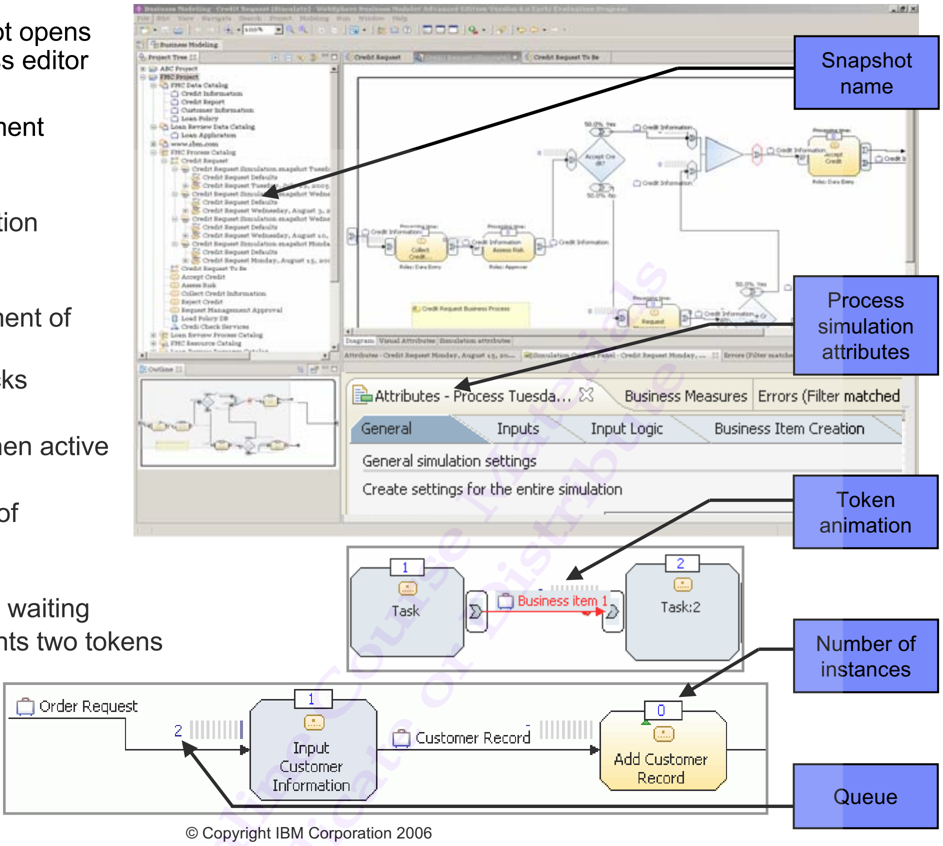
☑ Always show this window

Figure 4-9. Creating a simulation snapshot VB1861.0

Notes:

Simulation snapshot

- The simulation snapshot opens in a tab over the process editor
  - Snapshot name
    - Rename to document settings
  - Simulation attributes
    - Define the simulation behavior
  - Token animation
    - Watch the movement of tokens
    - Look for bottlenecks
  - Activity color
    - Changes color when active
  - Instances
    - Displays number of instances
  - Queue
    - Number of tokens waiting
    - Each bar represents two tokens
  - Animation is not necessary
    - Turning off shortens execution time



General simulation settings

Create settings for the entire simulation

Snapshot name

Process simulation attributes

Token animation

Number of instances

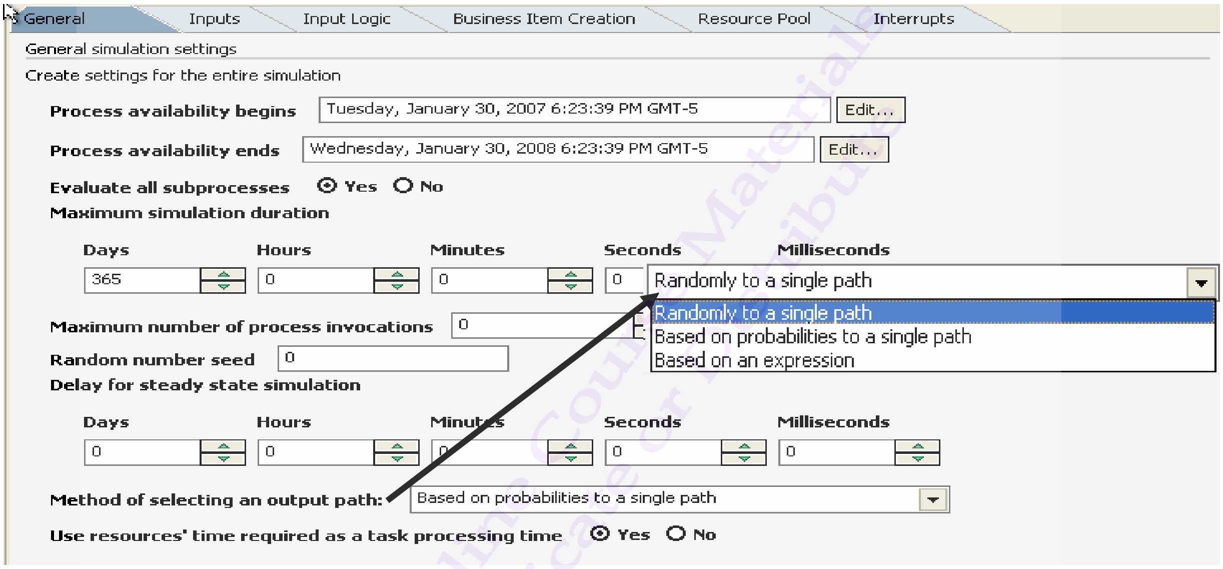
Queue

Figure 4-10. Simulation snapshot VB1861.0

Notes:

Simulation attributes — general

- Process availability
  - Begin
  - End
- Evaluate subprocesses
- Maximum simulation duration
  - Real time in which the simulation occurs
- Maximum number of process invocations
  - Per simulation run
- Random number seed
- Delay for steady state simulation
  - Virtual wait time before collecting statistics
  - Skip data collection during startup
- Method of selecting output path
- Use resources' time required as task process time



General simulation settings

Create settings for the entire simulation

Process availability begins Tuesday, January 30, 2007 6:23:39 PM GMT-5

Process availability ends Wednesday, January 30, 2008 6:23:39 PM GMT-5

Evaluate all subprocesses ● Yes ○ No

Maximum simulation duration

Days	Hours	Minutes	Seconds	Milliseconds
365	0	0	0	

Randomly to a single path
- Randomly to a single path
- Based on probabilities to a single path
- Based on an expression

Maximum number of process invocations 0

Random number seed 0

Delay for steady state simulation

Days	Hours	Minutes	Seconds	Milliseconds
0	0	0	0	0

Method of selecting an output path: Based on probabilities to a single path

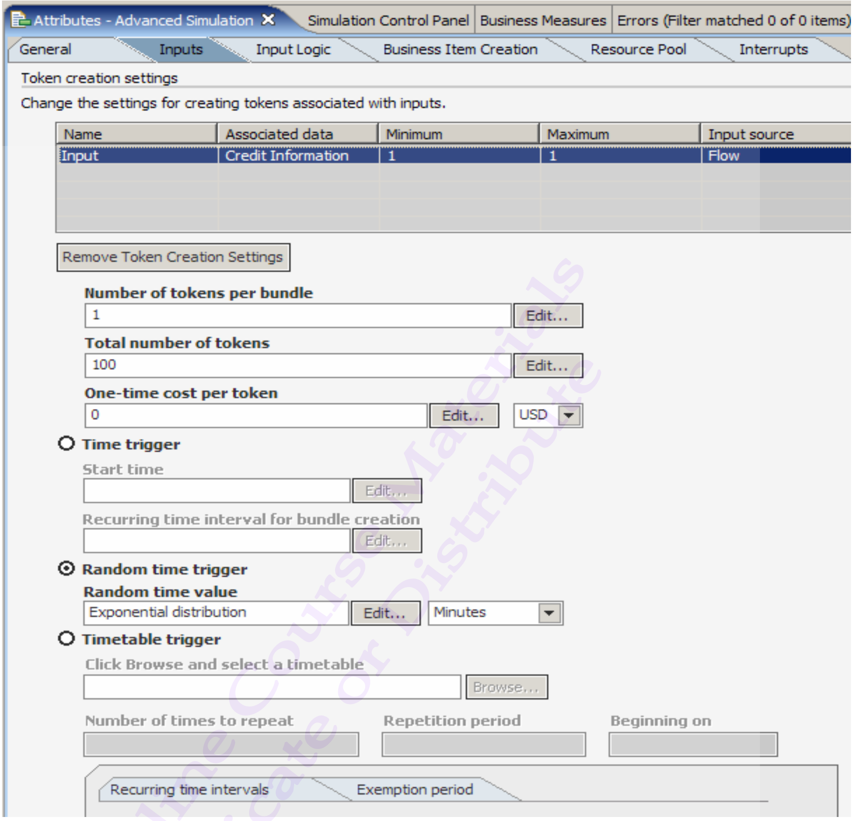
Use resources' time required as a task processing time ● Yes ○ No

Figure 4-11. Simulation attributes — general VB1861.0

Notes:

Simulation attributes — inputs

- Associate a token with a business item
  - The business item will arrive with the token
- Number of tokens per bundle
  - Number of tokens that arrive at the same time
- Total number of tokens
  - Number of tokens generated per run
  - Total tokens are grouped by bundle
- One-time cost per token
- Time trigger
  - Fixed interval with a start time
- Random time trigger
  - Select a statistical distribution for token generation
- Timetable trigger
  - Use a timetable to generate tokens



Token creation settings

Change the settings for creating tokens associated with inputs.

Name	Associated data	Minimum	Maximum	Input source
Input	Credit Information	1	1	Flow

Number of tokens per bundle: 1

Total number of tokens: 100

One-time cost per token: 0 USD

○ Time trigger

Start time:

Recurring time interval for bundle creation:

● Random time trigger

Random time value: Exponential distribution, Minutes

○ Timetable trigger

Click Browse and select a timetable:

Number of times to repeat: Repetition period: Beginning on:

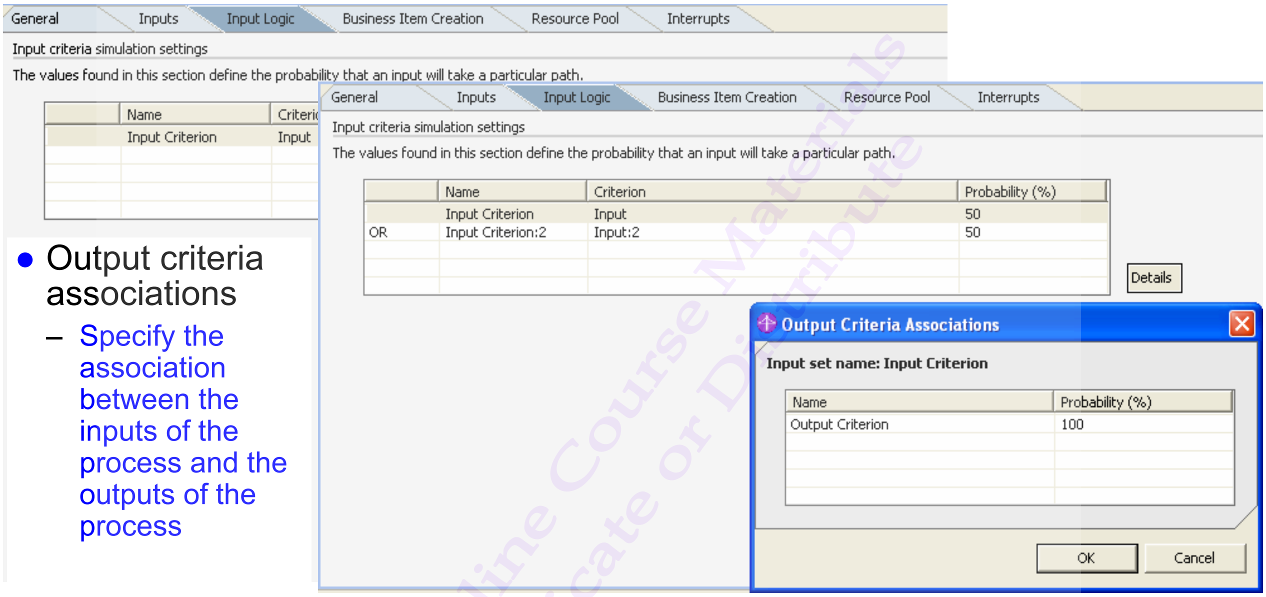
Figure 4-12. Simulation attributes — inputs VB1861.0

Notes:

Simulation attributes — input logic

- Input criteria simulation settings
  - For one process input
    - The probability of the input is 100%
  - For multiple process inputs
    - Specifies the probability of receiving each of the different inputs or combination of inputs

- Output criteria associations
  - Specify the association between the inputs of the process and the outputs of the process



Input criteria simulation settings

The values found in this section define the probability that an input will take a particular path.

	Name	Criteri
	Input Criterion	Input

Input criteria simulation settings

The values found in this section define the probability that an input will take a particular path.

	Name	Criterion	Probability (%)
	Input Criterion	Input	50
OR	Input Criterion:2	Input:2	50

Input set name: Input Criterion

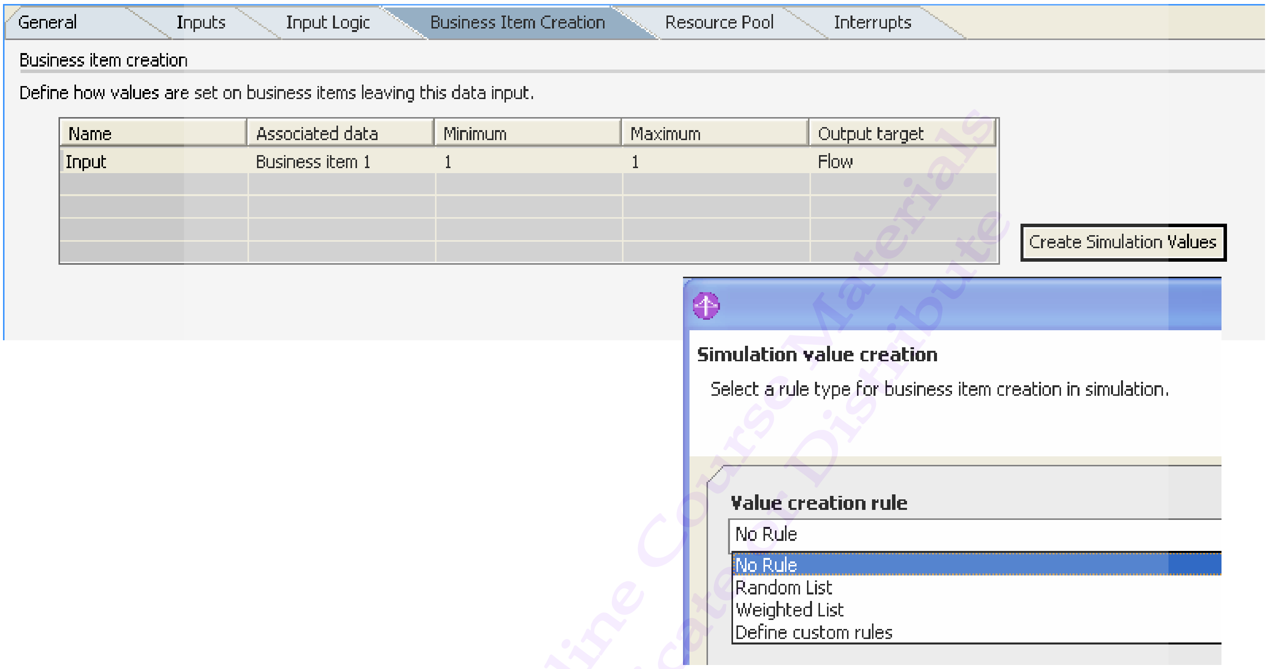
Name	Probability (%)
Output Criterion	100

Figure 4-13. Simulation attributes — input logic VB1861.0

Notes:

Simulation attributes — business item creation

- Business item creation
  - Specifies the business items to be created by the process
- Create simulation values
  - Specifies the rule used to create business items



Business item creation

Define how values are set on business items leaving this data input.

Name	Associated data	Minimum	Maximum	Output target
Input	Business item 1	1	1	Flow

Simulation value creation

Select a rule type for business item creation in simulation.

Value creation rule

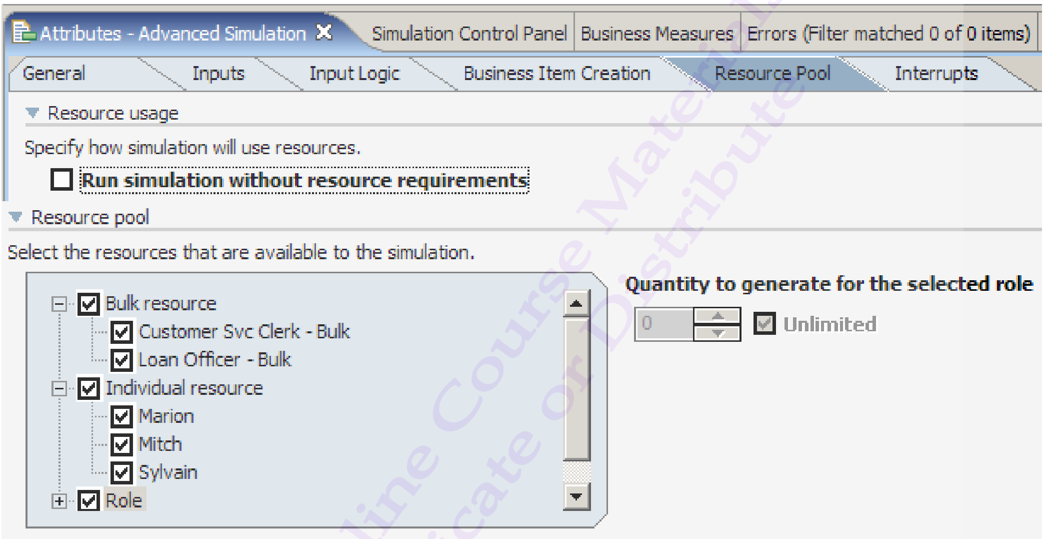
No Rule

Figure 4-14. Simulation attributes — business item creation VB1861.0

Notes:

Simulation attributes — resource pool

- Resource usage
  - Run simulation without resource requirements.
    - Ignore the resource requirements.
    - Use to test the model without resources.
- Resource pool
  - Select resources to be made available to the simulation
  - By default, all resources defined in your project are available
  - If the roles are checked the simulation will supply as many roles as needed
    - The number of roles can be limited



Resource usage

Specify how simulation will use resources.

☐ **Run simulation without resource requirements**

Resource pool

Select the resources that are available to the simulation.

- ☑ Bulk resource
  - ☑ Customer Svc Clerk - Bulk
  - ☑ Loan Officer - Bulk
- ☑ Individual resource
  - ☑ Marion
  - ☑ Mitch
  - ☑ Sylvain
- ☑ Role

Quantity to generate for the selected role

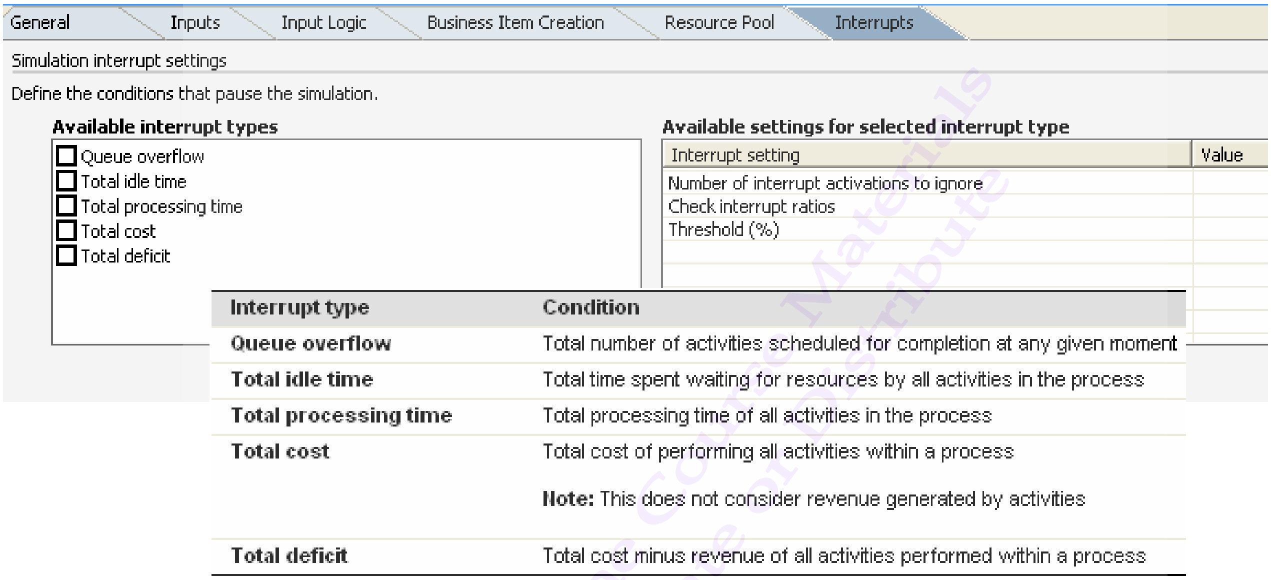
0 ☑ Unlimited

Figure 4-15. Simulation attributes — resource pool VB1861.0

Notes:

Simulation attributes — interrupts

- Interrupts allow the monitoring of specific conditions
  - Cost overruns, excessive times spent waiting for resources
    - The simulation run is automatically suspended when a condition occurs



Simulation interrupt settings

Define the conditions that pause the simulation.

Available interrupt types

☐ Queue overflow
☐ Total idle time
☐ Total processing time
☐ Total cost
☐ Total deficit

Available settings for selected interrupt type

Interrupt setting	Value
Number of interrupt activations to ignore	
Check interrupt ratios	
Threshold (%)	

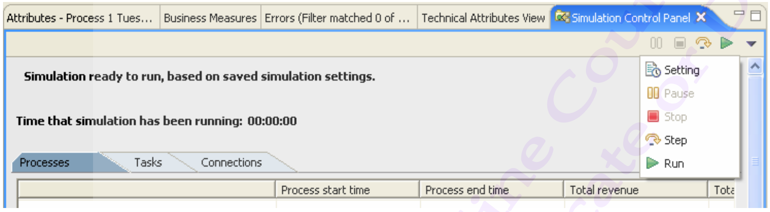
Interrupt type	Condition
Queue overflow	Total number of activities scheduled for completion at any given moment
Total idle time	Total time spent waiting for resources by all activities in the process
Total processing time	Total processing time of all activities in the process
Total cost	Total cost of performing all activities within a process **Note:** This does not consider revenue generated by activities
Total deficit	Total cost minus revenue of all activities performed within a process

Figure 4-16. Simulation attributes — interrupts VB1861.0

Notes:

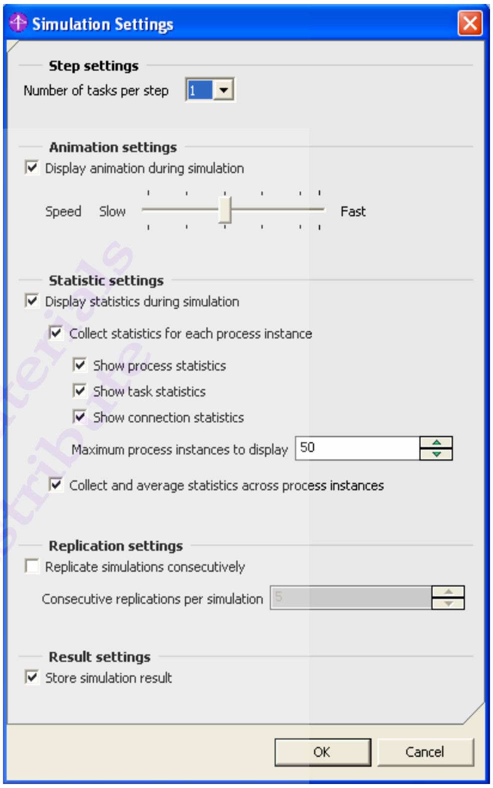
Simulation control panel

- Simulation Control Panel tab
  - Setting, pause, stop, step, run
- Simulation settings
  - Step settings
  - Animation settings
    - Display animation
    - Speed
  - Statistic settings
    - Specify what is displayed in statistics
  - Replication settings
  - Result settings



Simulation ready to run, based on saved simulation settings.

Time that simulation has been running: 00:00:00



Simulation Settings

Step settings

Number of tasks per step 1

Animation settings

☑ Display animation during simulation

Speed Slow Fast

Statistic settings

☑ Display statistics during simulation

☑ Collect statistics for each process instance

☑ Show process statistics

☑ Show task statistics

☑ Show connection statistics

Maximum process instances to display 50

☑ Collect and average statistics across process instances

Replication settings

☐ Replicate simulations consecutively

Consecutive replications per simulation 5

Result settings

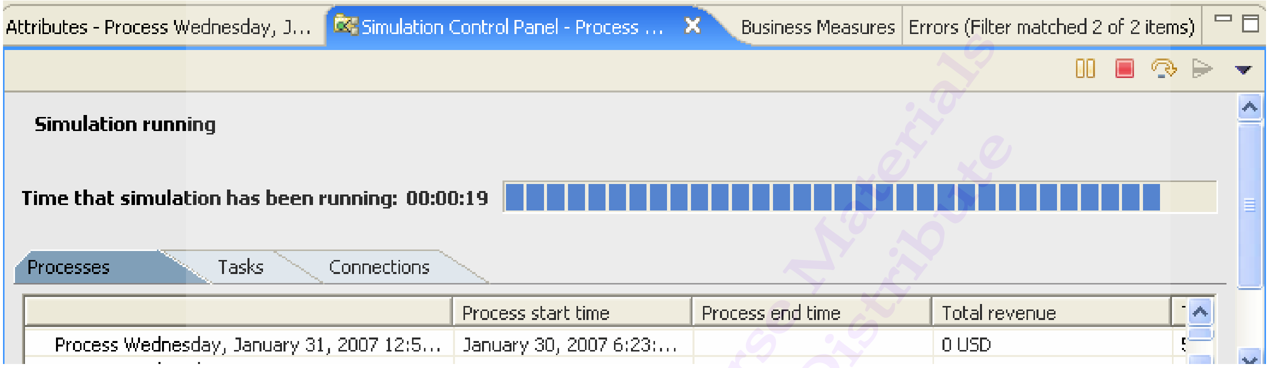
☑ Store simulation result

Figure 4-17. Simulation control panel VB1861.0

Notes:

Simulation running

- Real time the simulation is running
- Data updated as model is running


Attributes - Process Wednesday, J...
Simulation Control Panel - Process ...
Business Measures
Errors (Filter matched 2 of 2 items)
Processes
Tasks
Connections

Simulation running

Time that simulation has been running: 00:00:19

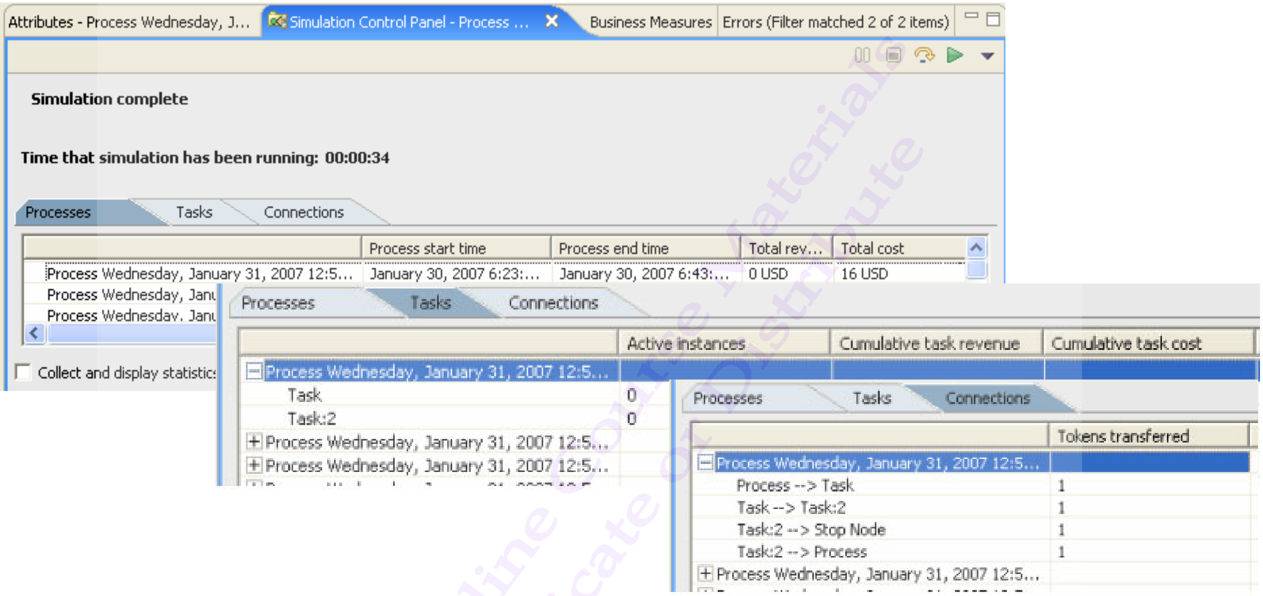
	Process start time	Process end time	Total revenue
Process Wednesday, January 31, 2007 12:5...	January 30, 2007 6:23:...		0 USD

Figure 4-18. Simulation running VB1861.0

Notes:

Simulation statistics

- Displayed in a tab over the attributes
  - Processes
    - Check box — collect and display statistics across process instances
  - Tasks
  - Connections


Attributes - Process Wednesday, J...
Simulation Control Panel - Process ...
Business Measures
Errors (Filter matched 2 of 2 items)
Processes
Tasks
Connections

Simulation complete

Time that simulation has been running: 00:00:34

	Process start time	Process end time	Total rev...	Total cost
Process Wednesday, January 31, 2007 12:5...	January 30, 2007 6:23:...	January 30, 2007 6:43:...	0 USD	16 USD
Process Wednesday, Janu				
Process Wednesday, Janu				

☐ Collect and display statistic

	Active instances	Cumulative task revenue	Cumulative task cost
⊟ Process Wednesday, January 31, 2007 12:5...			
Task	0		
Task:2	0		
⊞ Process Wednesday, January 31, 2007 12:5...			
⊞ Process Wednesday, January 31, 2007 12:5...			

	Tokens transferred
⊟ Process Wednesday, January 31, 2007 12:5...	
Process --> Task	1
Task --> Task:2	1
Task:2 --> Stop Node	1
Task:2 --> Process	1
⊞ Process Wednesday, January 31, 2007 12:5...	

Figure 4-19. Simulation statistics VB1861.0

Notes:

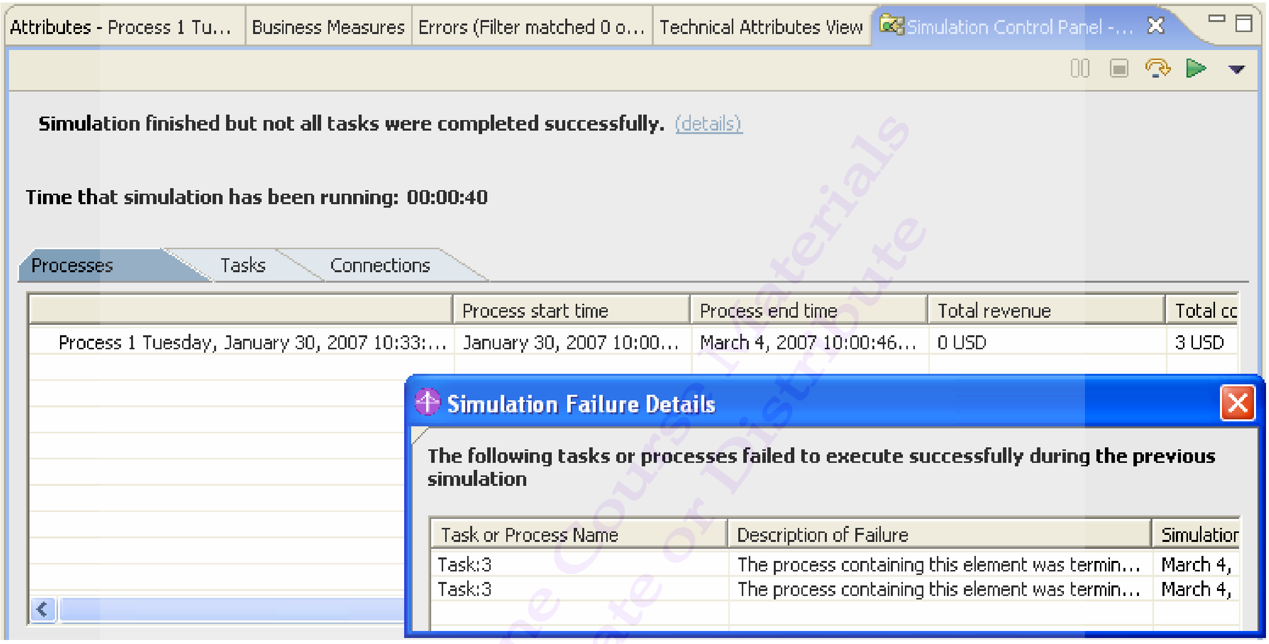
Under **Statistic settings**, select **Display statistics during simulation** if you want to see the statistics generated by the process as the tool simulates it. Otherwise, the simulation runs and produces simulation results that you can use for dynamic analysis, but does not show simulation statistics in the control panel. If you select this option, you can also specify which elements to display in the statistics, as follows:

> Select **Collect statistics for each process instance** if you want to see statistics for each generated process instance. If you select this option, you can also enable or disable statistics gathering for processes, tasks, and connections, by selecting or clearing the following check boxes:
>
> - **Show process statistics**
> - **Show task statistics**
> - **Show connection statistics**
>
> Select a value for **Maximum process instances to display**.

Select **Collect and average statistics across process instances** if you want to enable viewing generated statistics as averages for all process instances. **Note:** If you want to display generated statistics as averages, you must enable this option and also select **Collect and display statistics across process instances** on the control panel.

Simulation errors

- Simulation finished but not all tasks were completed successfully
  - (details)



Attributes - Process 1 Tu...
Business Measures
Errors (Filter matched 0 o...
Technical Attributes View
Simulation Control Panel -...
Processes
Tasks
Connections

Simulation finished but not all tasks were completed successfully. (details)

Time that simulation has been running: 00:00:40

	Process start time	Process end time	Total revenue	Total cc
Process 1 Tuesday, January 30, 2007 10:33:...	January 30, 2007 10:00...	March 4, 2007 10:00:46...	0 USD	3 USD

Simulation Failure Details

The following tasks or processes failed to execute successfully during the previous simulation

Task or Process Name	Description of Failure	Simulatior
Task:3	The process containing this element was termin...	March 4,
Task:3	The process containing this element was termin...	March 4,

Figure 4-20. Simulation errors VB1861.0

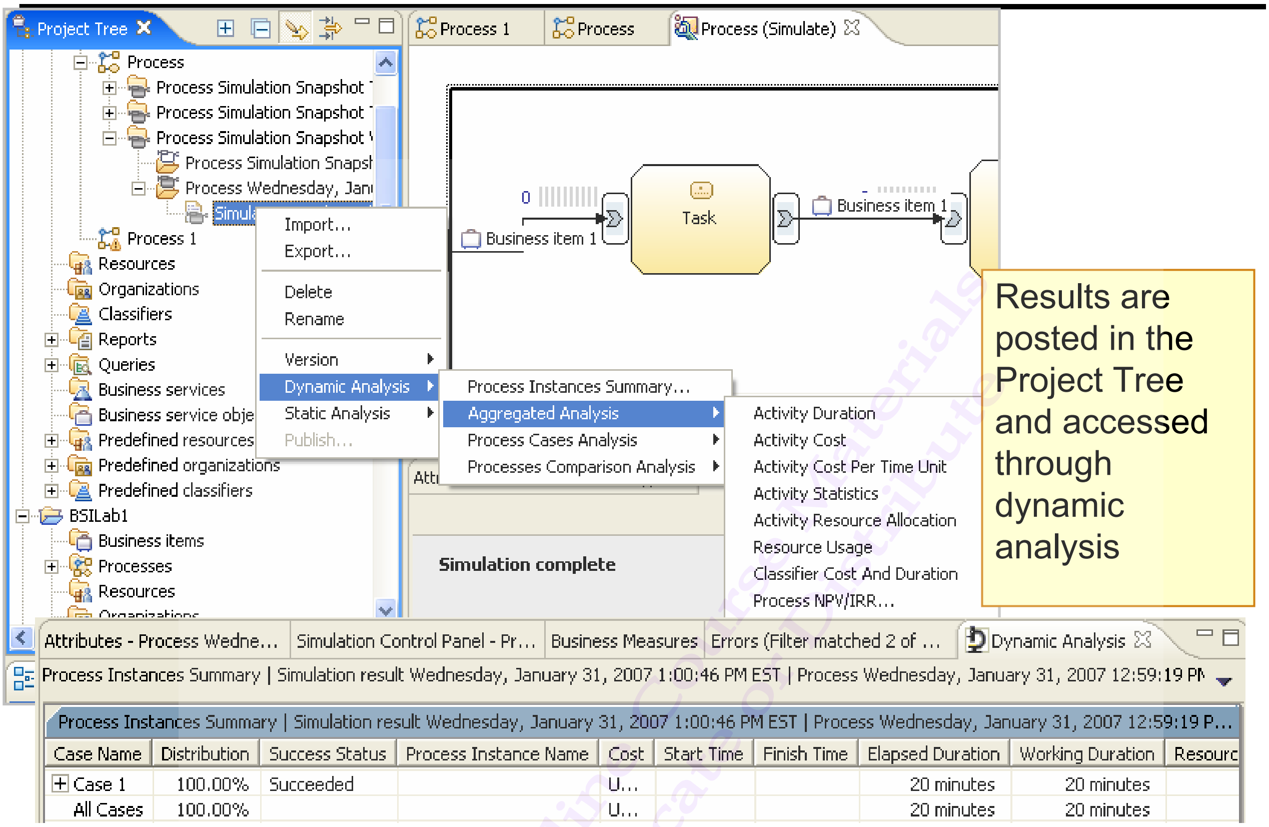
Notes:

You receive a message saying that there are not enough resources available to complete the simulation.

If a simulation stops and you receive a message saying that there were not enough resources available to complete the simulation, the message is referring to the modeled resource within the simulation, not to a problem with the computer system. You need more resources available for the process. The following are situations that can cause this error:

- A task requires two field technicians but only one is available for the process.
- A task requires a field technician on Monday, and can wait for two days until Wednesday, but the field technician is not available until Friday.
- Roles are assigned to tasks, but there are not enough resources available to fulfill the role requirements.

Simulation results



Process Instances Summary | Simulation result Wednesday, January 31, 2007 1:00:46 PM EST | Process Wednesday, January 31, 2007 12:59:19 PM

Process Instances Summary | Simulation result Wednesday, January 31, 2007 1:00:46 PM EST | Process Wednesday, January 31, 2007 12:59:19 P...

Case Name	Distribution	Success Status	Process Instance Name	Cost	Start Time	Finish Time	Elapsed Duration	Working Duration	Resourc
⊞ Case 1	100.00%	Succeeded		U...			20 minutes	20 minutes	
All Cases	100.00%			U...			20 minutes	20 minutes	

Results are posted in the Project Tree and accessed through dynamic analysis

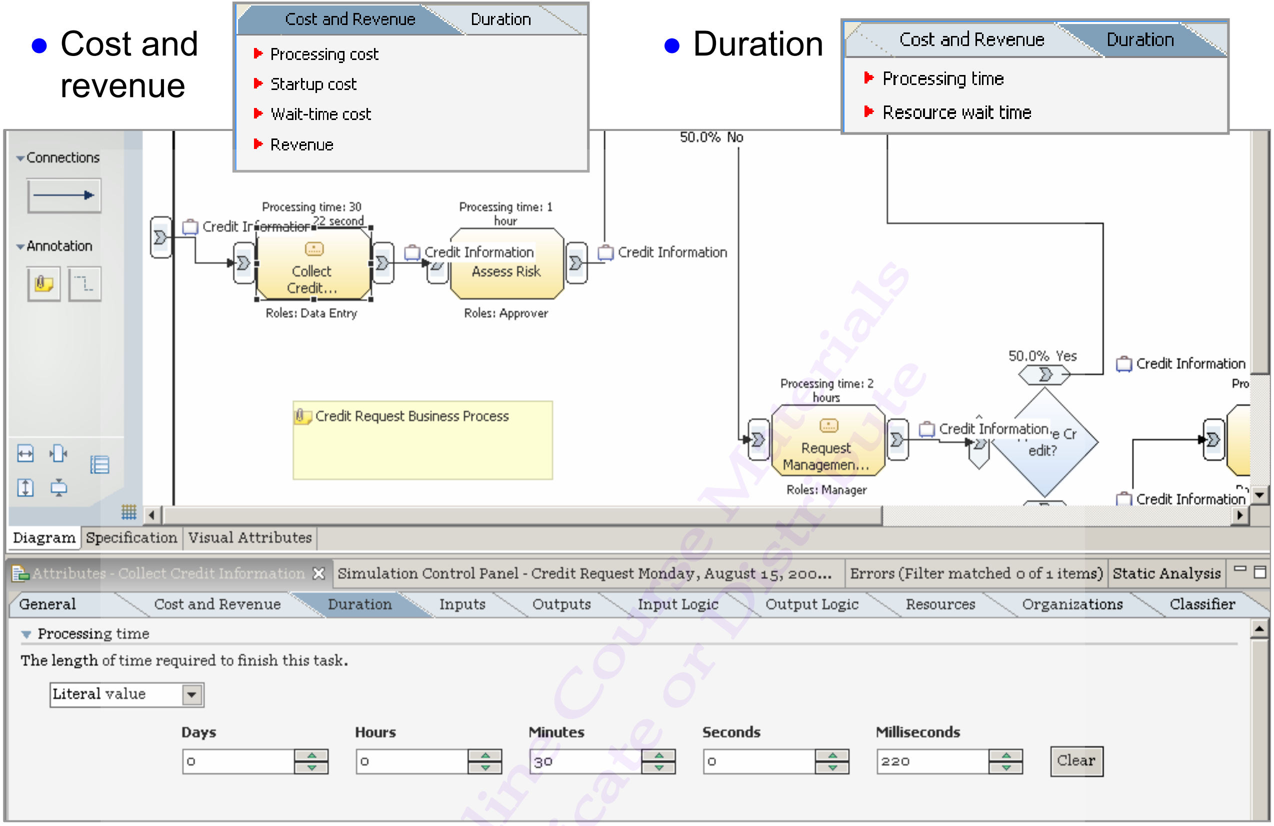
Figure 4-21. Simulation results VB1861.0

Notes:

Self-Paced Online Course Materials
Do Not Duplicate/Distribute

Changing model attributes in the simulation model

- Cost and revenue
  - Processing cost
  - Startup cost
  - Wait-time cost
  - Revenue
- Duration
  - Processing time
  - Resource wait time



Processing time

The length of time required to finish this task.

Literal value

Days: 0
Hours: 0
Minutes: 30
Seconds: 0
Milliseconds: 220

Figure 4-22. Changing model attributes in the simulation model VB1861.0

Notes:

Setting simulation preferences

- Simulation attributes control the behavior of your simulation runs so that simulation snapshots and results reflect real-world behavior.

- Simulation attributes can be set at multiple levels.
  - At the highest level are the simulation preferences.
  - At the next level are the simulation snapshot settings.
  - At the lowest level are those in a particular simulation profile.

Figure 4-23. Setting simulation preferences VB1861.0

Notes:

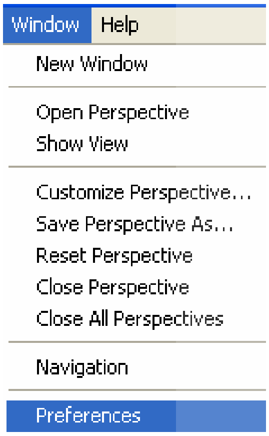
Simulation attributes can be set at multiple levels.

- At the highest level are the simulation preferences.
  - Set through the preferences window
  - Used as default values for new simulation snapshots and profiles
- At the next level are the simulation snapshot settings.
  - Subset of the attributes available in the preferences
  - Initial values are taken from the preferences
  - Override these values by editing the "snapshot defaults"
- At the lowest level are those in a particular simulation profile.
  - Initial values are taken from a combination of the simulation preferences and simulation snapshot settings.
  - Override the values in the simulation attribute tabs.

- The settings in the simulation profile are used for simulation and analysis.

Simulation preferences

- Highest level
  - From the tool bar



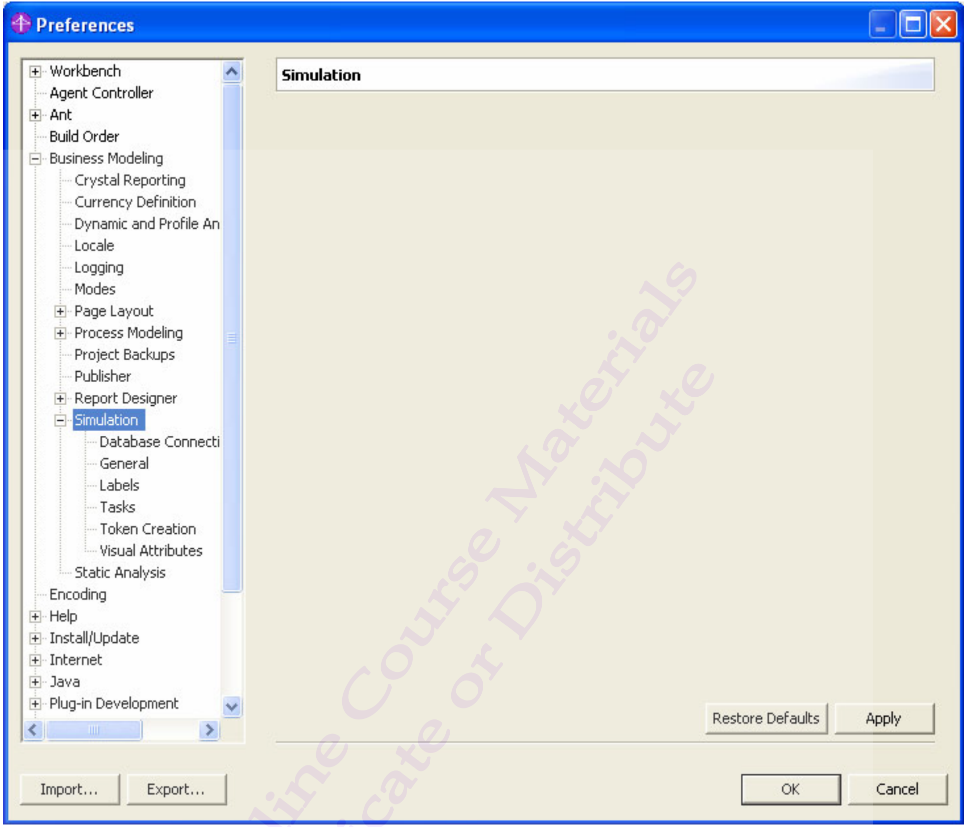


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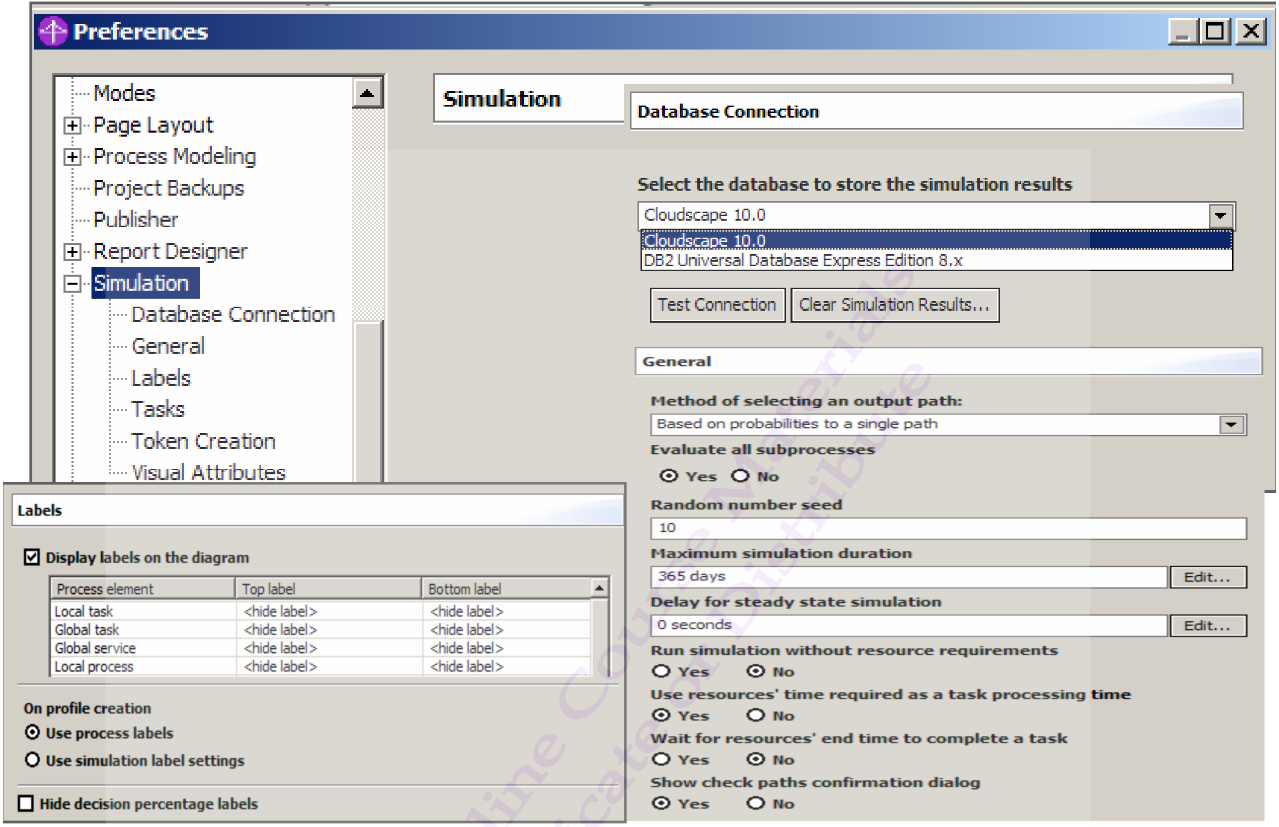
Figure 4-24. Simulation preferences VB1861.0

Notes:

Tabs — Database Connection, General, Labels



Database Connection

Select the database to store the simulation results

Cloudscape 10.0

- Cloudscape 10.0
- DB2 Universal Database Express Edition 8.x

General

Method of selecting an output path: Based on probabilities to a single path

Evaluate all subprocesses: ● Yes ○ No

Random number seed: 10

Maximum simulation duration: 365 days

Delay for steady state simulation: 0 seconds

Run simulation without resource requirements: ○ Yes ● No

Use resources' time required as a task processing time: ● Yes ○ No

Wait for resources' end time to complete a task: ○ Yes ● No

Show check paths confirmation dialog: ● Yes ○ No

Labels

☑ Display labels on the diagram

Process element	Top label	Bottom label
Local task	<hide label>	<hide label>
Global task	<hide label>	<hide label>
Global service	<hide label>	<hide label>
Local process	<hide label>	<hide label>

On profile creation

● Use process labels

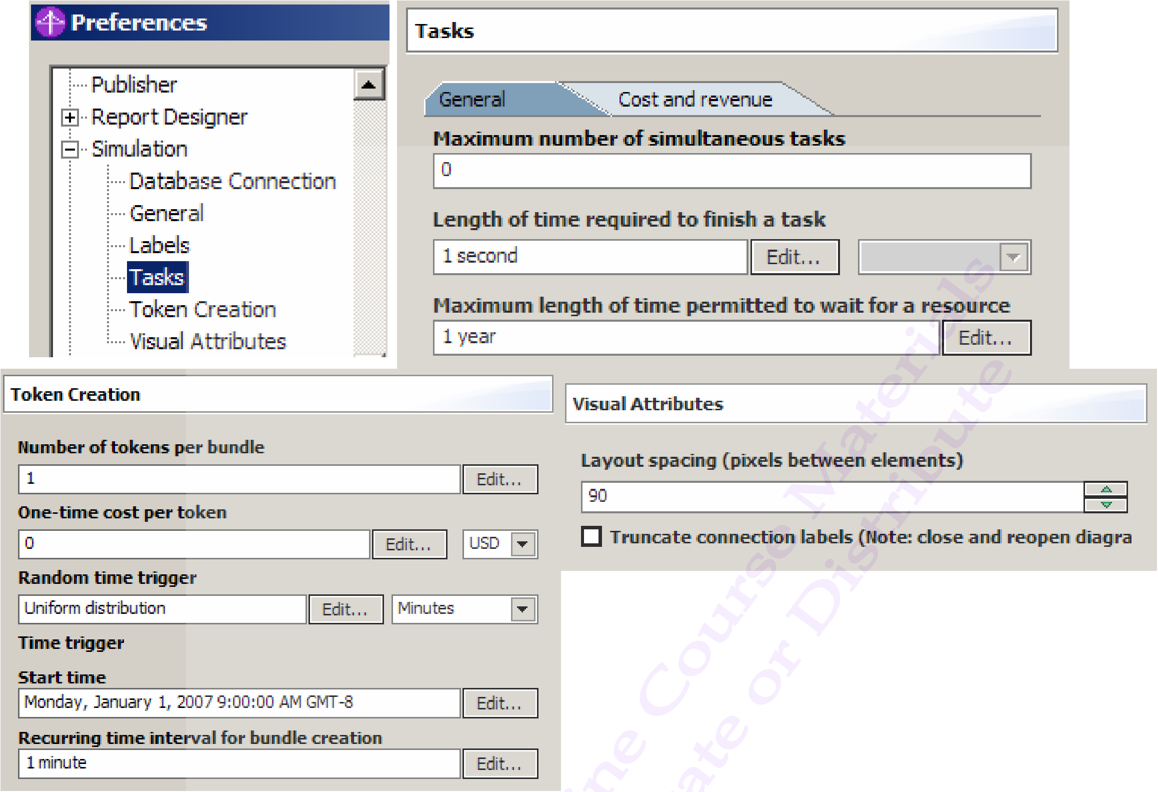
○ Use simulation label settings

☐ Hide decision percentage labels

Figure 4-25. Tabs — Database Connection, General, Labels VB1861.0

Notes:

Tabs — Tasks, Token Creation, Visual Attributes



Tasks

Maximum number of simultaneous tasks: 0

Length of time required to finish a task: 1 second

Maximum length of time permitted to wait for a resource: 1 year

Token Creation

Number of tokens per bundle: 1

One-time cost per token: 0 USD

Random time trigger: Uniform distribution, Minutes

Time trigger

Start time: Monday, January 1, 2007 9:00:00 AM GMT-8

Recurring time interval for bundle creation: 1 minute

Visual Attributes

Layout spacing (pixels between elements): 90

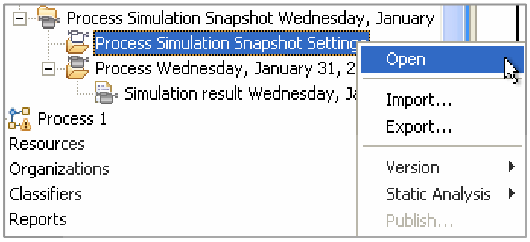
☐ Truncate connection labels (Note: close and reopen diagra

Figure 4-26. Tabs — Tasks, Token Creation, Visual Attributes VB1861.0

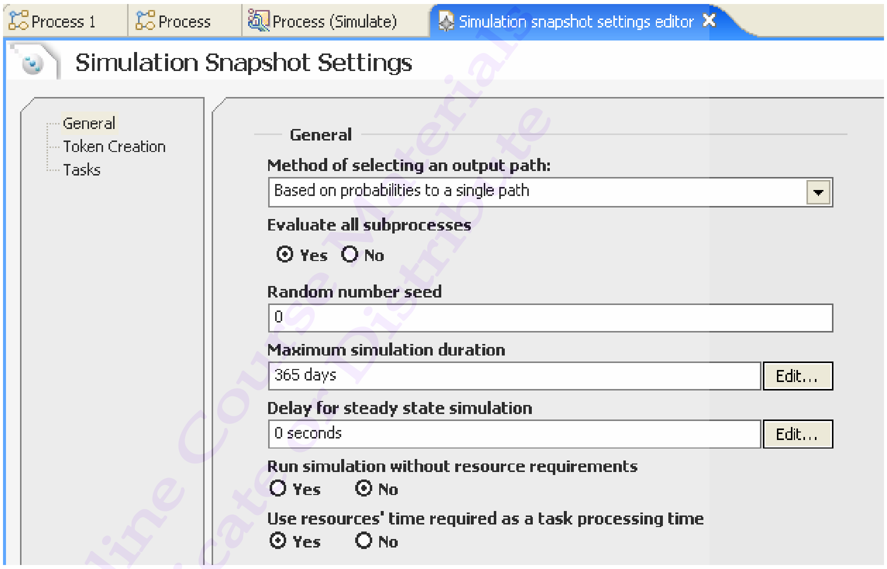
Notes:

Self-Paced Course Materials
Do Not Duplicate or Distribute

Simulation Snapshot Settings (1 of 2)


Process Simulation Snapshot Wednesday, January
Process Simulation Snapshot Setting
Process Wednesday, January 31, 2
Simulation result Wednesday, Ja
Process 1
Resources
Organizations
Classifiers
Reports
Open
Import...
Export...
Version
Static Analysis
Publish...

- Next level from the Project Tree
- General



Simulation Snapshot Settings

General

Method of selecting an output path: Based on probabilities to a single path

Evaluate all subprocesses
● Yes ○ No

Random number seed
0

Maximum simulation duration
365 days

Delay for steady state simulation
0 seconds

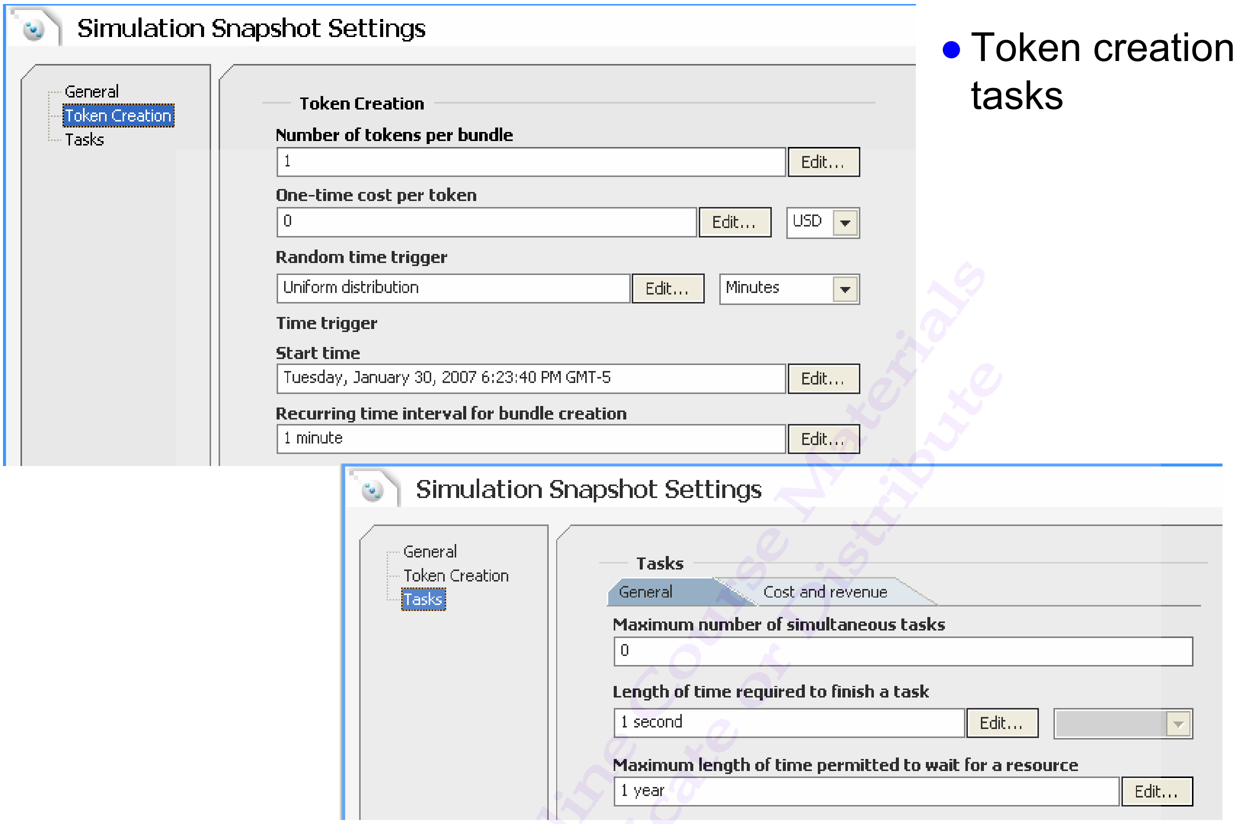
Run simulation without resource requirements
○ Yes ● No

Use resources' time required as a task processing time
● Yes ○ No

Figure 4-27. Simulation Snapshot Settings (1 of 2) VB1861.0

Notes:

Simulation Snapshot Settings (2 of 2)



Token Creation

Number of tokens per bundle: 1 [Edit...]

One-time cost per token: 0 [Edit...] USD

Random time trigger: Uniform distribution [Edit...] Minutes

Time trigger

Start time: Tuesday, January 30, 2007 6:23:40 PM GMT-5 [Edit...]

Recurring time interval for bundle creation: 1 minute [Edit...]

Tasks

General | Cost and revenue

Maximum number of simultaneous tasks: 0

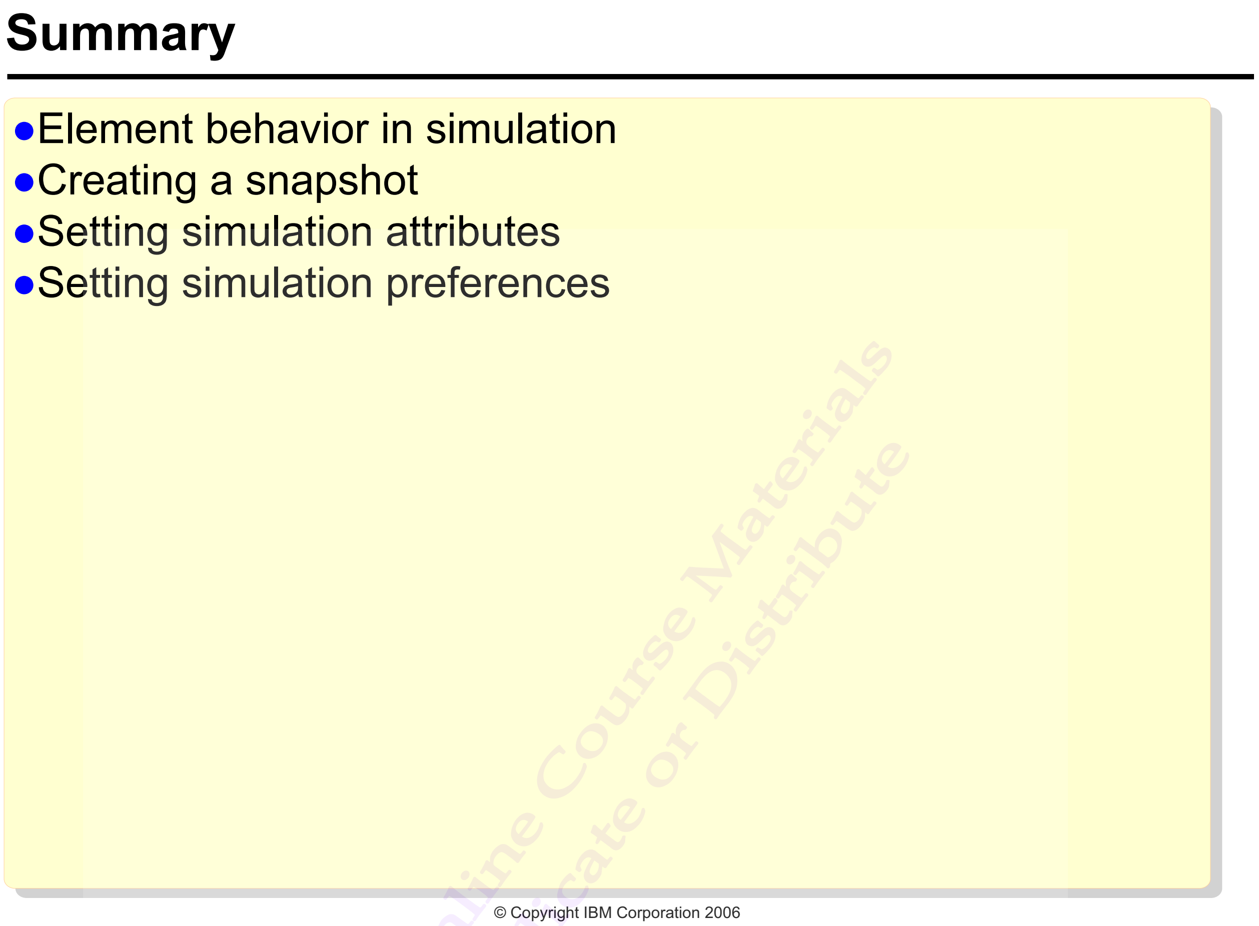
Length of time required to finish a task: 1 second [Edit...]

Maximum length of time permitted to wait for a resource: 1 year [Edit...]

- Token creation, tasks

Figure 4-28. Simulation Snapshot Settings (2 of 2) VB1861.0

Notes:



Summary

- Element behavior in simulation
- Creating a snapshot
- Setting simulation attributes
- Setting simulation preferences

Figure 4-29. Summary VB1861.0

Notes:

Exercise

- Running a process simulation
- Using global simulation settings
- Running simulation with global simulation attributes
- Using local simulation attributes
- Running simulation with local simulation attributes

Figure 4-30. Exercise VB1861.0

Notes:

Review questions

- What is the difference between task duration and resource time requirements?
- What is the function of resource pool during simulation?
- When do you want to use interrupt during simulation?
- How do you turn off the animation during simulation so that it runs faster?

Figure 4-31. Review questions VB1861.0

Notes:

The solution can be found in the appendix of the Student Exercises.

Unit 5. Profile and dynamic analysis

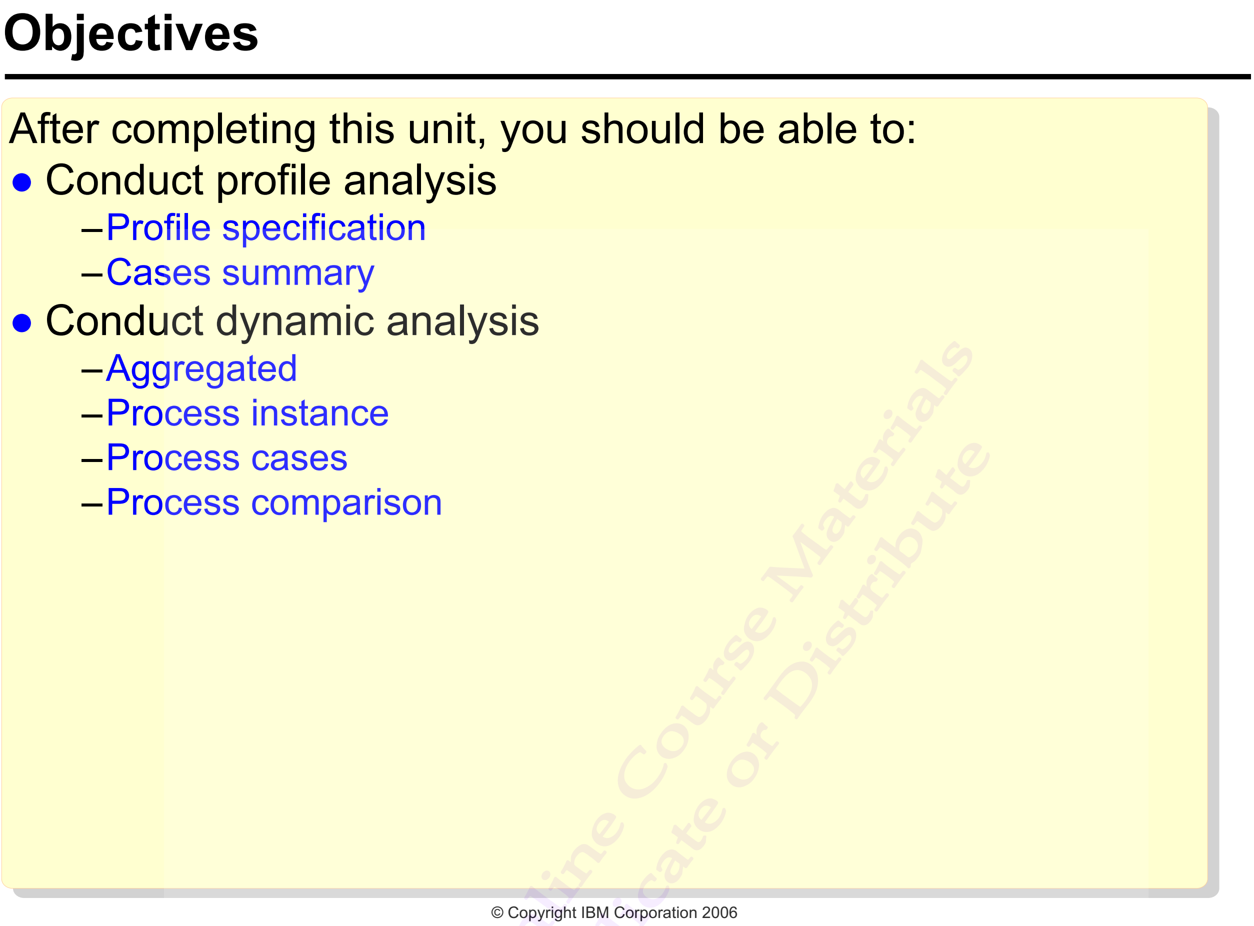
What this unit is about

This unit describes the profile and dynamic analysis.

What you should be able to do

After completing this unit, you should be able to:

- Conduct profile analysis
- Conduct dynamic analysis



Objectives

After completing this unit, you should be able to:

- Conduct profile analysis
  - Profile specification
  - Cases summary
- Conduct dynamic analysis
  - Aggregated
  - Process instance
  - Process cases
  - Process comparison

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Figure 5-1. Objectives VB1861.0

Notes:

Analyzing process simulation profiles

- Performed on process simulation profiles before simulation
  - A simulation profile must be created before conducting the analysis
  - Profile specification
    - Shows the simulation settings for each of the activities in a simulation profile
  - Static process cases summary
    - Shows summary information describing each of the process cases (paths) through the process recorded by the simulation profile

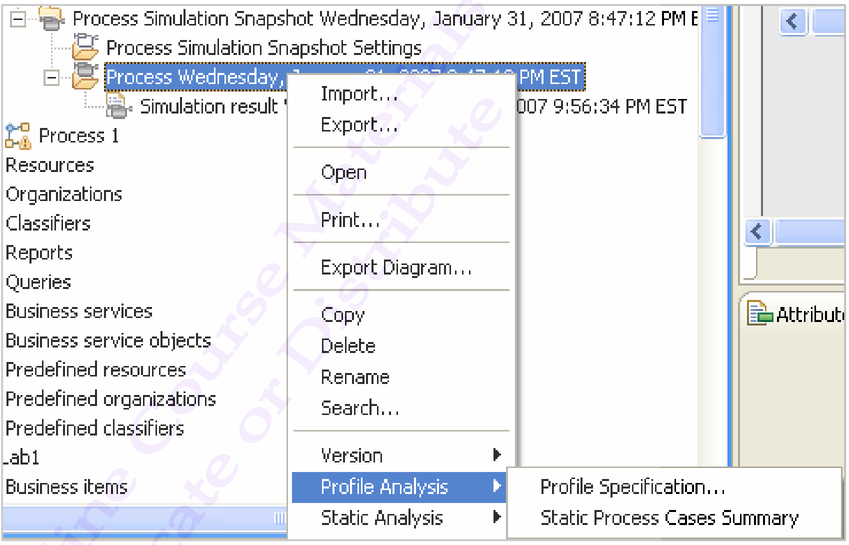

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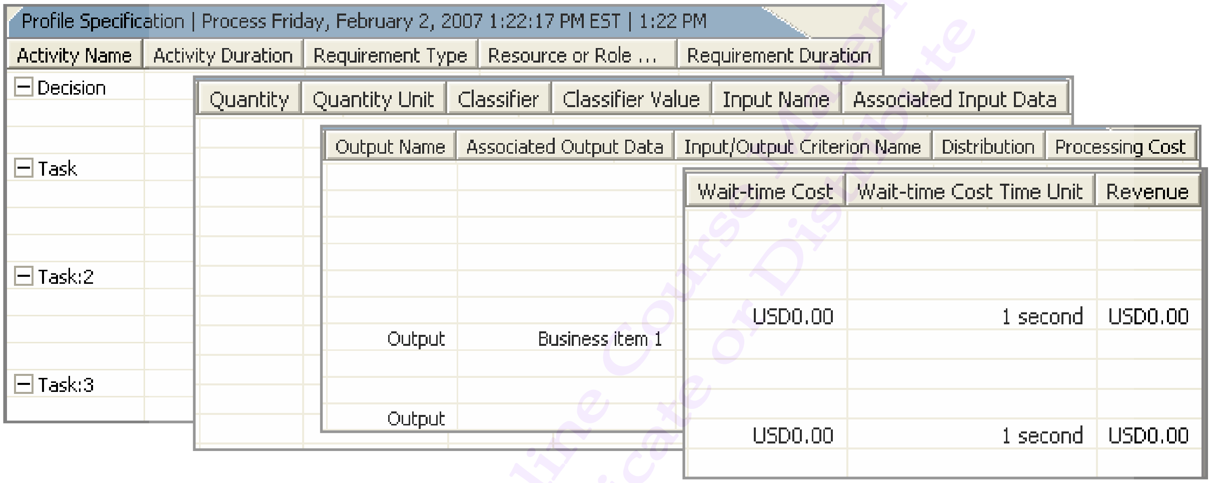
Figure 5-2. Analyzing process simulation profiles VB1861.0

Notes:

Profile specification

- Provides a way of reviewing, documenting, and validating the values that are used during the run of a simulation
- This analysis reports seven different types of activities:
  - Decisions, loops, tasks, global tasks, services, subprocesses, and global processes
- Analysis attributes can be customized by activity type



Profile Specification | Process Friday, February 2, 2007 1:22:17 PM EST | 1:22 PM

Activity Name	Activity Duration	Requirement Type	Resource or Role ...	Requirement Duration
⊟ Decision				
⊟ Task				
⊟ Task:2				
⊟ Task:3				

Quantity	Quantity Unit	Classifier	Classifier Value	Input Name	Associated Input Data

Output Name	Associated Output Data	Input/Output Criterion Name	Distribution	Processing Cost
Output	Business item 1			
Output				

Wait-time Cost	Wait-time Cost Time Unit	Revenue
USD0.00	1 second	USD0.00
USD0.00	1 second	USD0.00

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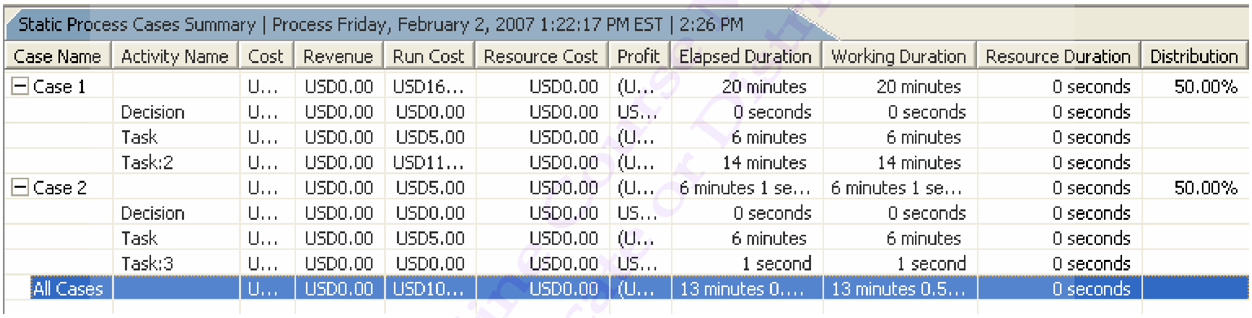
Figure 5-3. Profile specification VB1861.0

Notes:

Static process cases summary

- Shows each of the process cases (paths) through the process
- The model cannot contain the following elements, which keep the Modeler from determining a finite set of process cases:
  - Repositories, notification broadcasters, notification receivers, observers, timers
    - The presence of these elements causes an error during analysis.
  - Provides a comprehensive description of the possible paths
    - Including the costs and revenue generated by each possible path
    - And the expected relative frequencies of each path
  - Results for this analysis use several assumptions and limitations



Static Process Cases Summary | Process Friday, February 2, 2007 1:22:17 PM EST | 2:26 PM

Case Name	Activity Name	Cost	Revenue	Run Cost	Resource Cost	Profit	Elapsed Duration	Working Duration	Resource Duration	Distribution
⊟ Case 1		U...	USD0.00	USD16...	USD0.00	(U...	20 minutes	20 minutes	0 seconds	50.00%
	Decision	U...	USD0.00	USD0.00	USD0.00	US...	0 seconds	0 seconds	0 seconds	
	Task	U...	USD0.00	USD5.00	USD0.00	(U...	6 minutes	6 minutes	0 seconds	
	Task:2	U...	USD0.00	USD11...	USD0.00	(U...	14 minutes	14 minutes	0 seconds	
⊟ Case 2		U...	USD0.00	USD5.00	USD0.00	(U...	6 minutes 1 se...	6 minutes 1 se...	0 seconds	50.00%
	Decision	U...	USD0.00	USD0.00	USD0.00	US...	0 seconds	0 seconds	0 seconds	
	Task	U...	USD0.00	USD5.00	USD0.00	(U...	6 minutes	6 minutes	0 seconds	
	Task:3	U...	USD0.00	USD0.00	USD0.00	US...	1 second	1 second	0 seconds	
All Cases		U...	USD0.00	USD10...	USD0.00	(U...	13 minutes 0....	13 minutes 0.5...	0 seconds	

Figure 5-4. Static process cases summary VB1861.0

Notes:

Dynamic analysis

- Analysis of the results of a process simulation from different perspectives:
  - Time, money, and statistics
- Analysis can be performed at three levels of granularity:
  - Aggregated analysis
    - Uses all the data from the entire simulation
  - Process cases analysis
    - Uses data from specific cases
  - Process instance analysis
    - Uses data from a specific instance of a process case
- Comparative analysis
  - Comparing two simulation runs

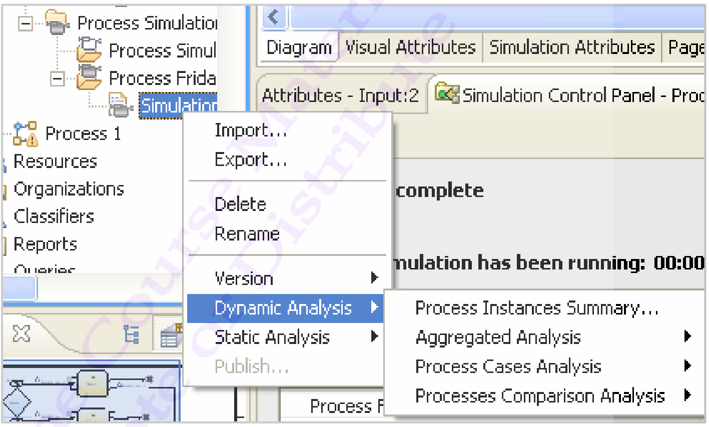


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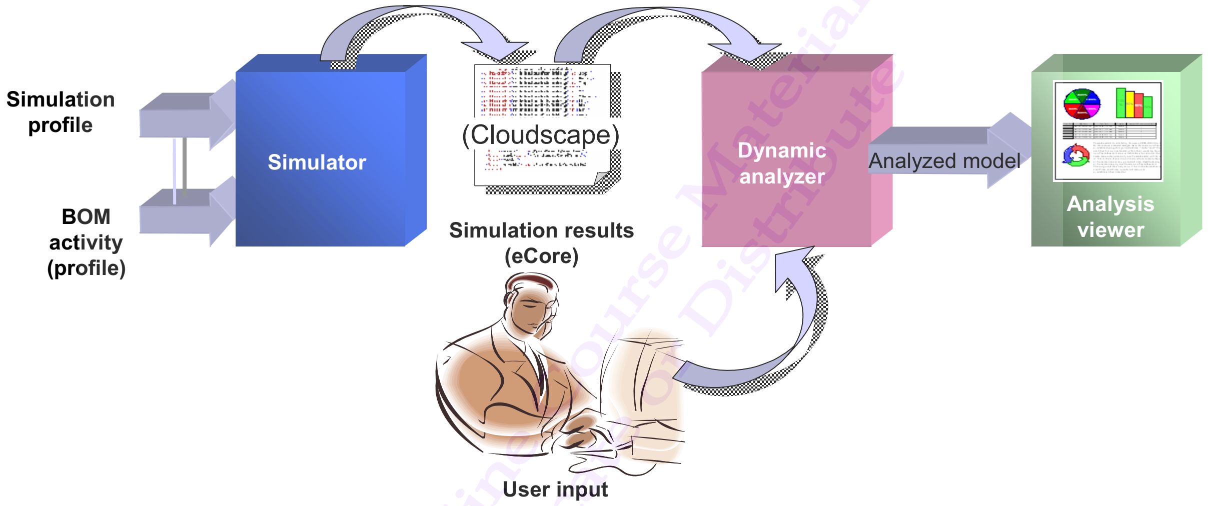
Figure 5-5. Dynamic analysis VB1861.0

Notes:

Analyzing simulation data

- A simulation provides a wealth of data, but without detailed analysis, that data is limited in its usefulness.
  - To get the most out of simulation data, dynamic analysis needs to be performed on the results.
  - Extract information regarding scheduling, costs, output, and other statistics pertaining to your processes.



Simulation profile

BOM activity (profile)

Simulator

(Cloudscape)

Simulation results (eCore)

Dynamic analyzer

Analyzed model

Analysis viewer

User input

Figure 5-6. Analyzing simulation data VB1861.0

Notes:

Aggregated analysis (1 of 3)

- Used to gain an understanding of the behavior of the process as a whole
  - Most broadly scoped of the dynamic analyses
    - Uses all the data from the entire simulation run

- Determines information about activities and resources used in all process instances generated during a simulation

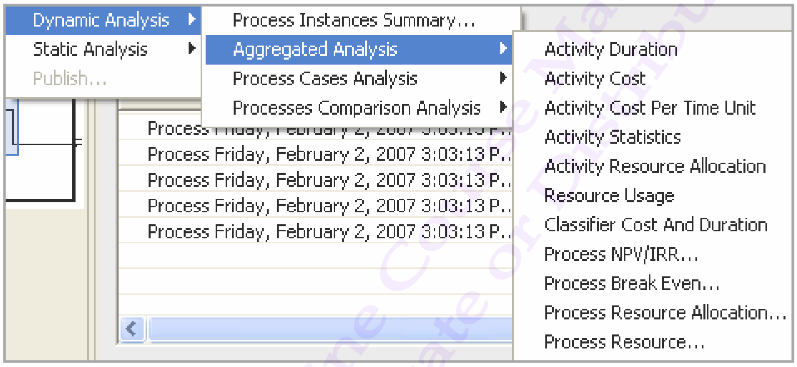

Dynamic Analysis
Static Analysis
Publish...
Process Instances Summary...
Aggregated Analysis
Process Cases Analysis
Processes Comparison Analysis
Activity Duration
Activity Cost
Activity Cost Per Time Unit
Activity Statistics
Activity Resource Allocation
Resource Usage
Classifier Cost And Duration
Process NPV/IRR...
Process Break Even...
Process Resource Allocation...
Process Resource...
Process Friday, February 2, 2007 3:03:13 P..
Process Friday, February 2, 2007 3:03:13 P..
Process Friday, February 2, 2007 3:03:13 P..
Process Friday, February 2, 2007 3:03:13 P..
Process Friday, February 2, 2007 3:03:13 P..

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Figure 5-7. Aggregated analysis (1 of 3) VB1861.0

Notes:

Aggregated analysis (2 of 3)

- Analyzing activity durations
  - Shows the average time it takes for each activity to complete
  - Indicates time taken waiting for resources to be available
- Analyzing activity costs
  - Understand the costs incurred by the activities
- Analyzing activity cost per time unit
  - Compute the average rate of cost of each activity
- Analyzing activity statistics
  - Information on the successful completion of the process activities
- Analyzing activity resource allocations
  - Summary of the resources allocated to each activity
  - Resources allocated and the average allocation time, cost, and shortages for each resource
- Analyzing resource usage
  - Activities that each resource was allocated to
  - Information about time, cost, and shortage durations
  - Detailed information about every allocation of the resource

Figure 5-8. Aggregated analysis (2 of 3) VB1861.0

Notes:

Aggregated analysis (3 of 3)

- Analyzing classifier cost and duration
  - Information regarding the average cost and duration of an entire classification of activities within the process.
- Analyzing net present value and internal rate of return
  - Current net present value of a process
    - Need to provide an initial cost, a discount rate, and a payback period
    - Internal rate of return necessary to produce a net present value of zero by the end of the payback period
- Analyzing the break-even point
  - Number of times a process must run to generate enough profit to recover a specified fixed cost
    - Value is based on the average costs and revenue for the process as a whole
- Analyzing process resource allocations
  - How each activity uses its resources to help identify resource shortages
  - How the resources required by an activity contribute to the cost
- Analyzing process resources
  - List of the resources used by the process
  - Average allocations of the resources

Figure 5-9. Aggregated analysis (3 of 3) VB1861.0

Notes:

Process cases analysis (1 of 2)

- Used to gain an understanding of a specific case (process flow) within the process.
- Shows weighted average values, where the average value is weighted for each process case to account for the distribution of process instances to that case relative to other cases.
- Process cases analysis organizes and averages the simulation results generated for each process case, which enables you to investigate variations in performance between different patterns of process flow.

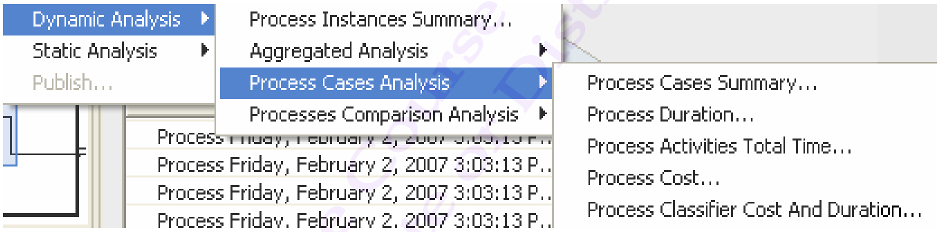
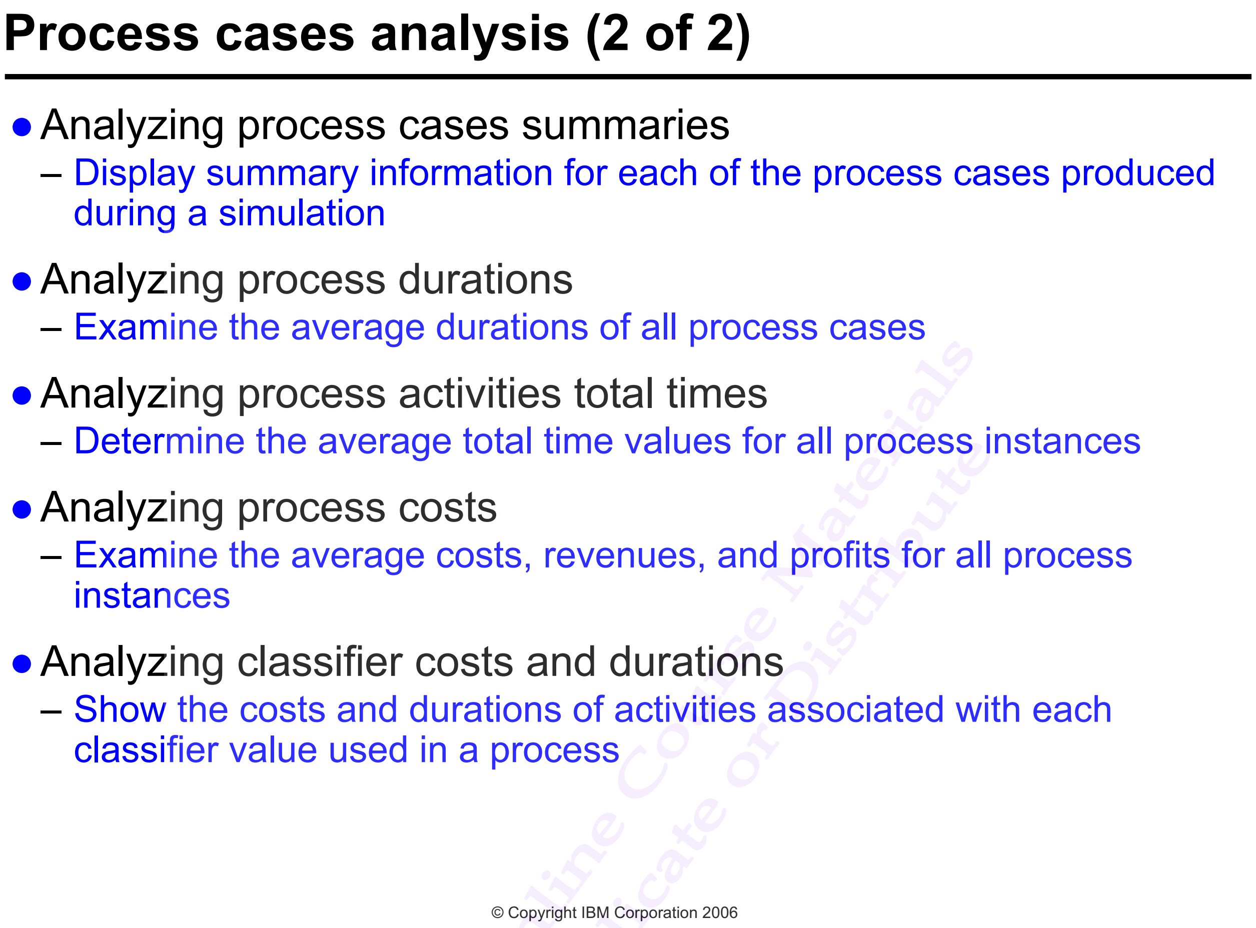

Dynamic Analysis
Static Analysis
Publish...
Process Instances Summary...
Aggregated Analysis
Process Cases Analysis
Processes Comparison Analysis
Process Cases Summary...
Process Duration...
Process Activities Total Time...
Process Cost...
Process Classifier Cost And Duration...
Process Friday, February 2, 2007 3:03:13 P..
Process Friday, February 2, 2007 3:03:13 P..
Process Friday, February 2, 2007 3:03:13 P..
Process Friday, February 2, 2007 3:03:13 P..

Figure 5-10. Process case analysis (1 of 2) VB1861.0

Notes:



Process cases analysis (2 of 2)

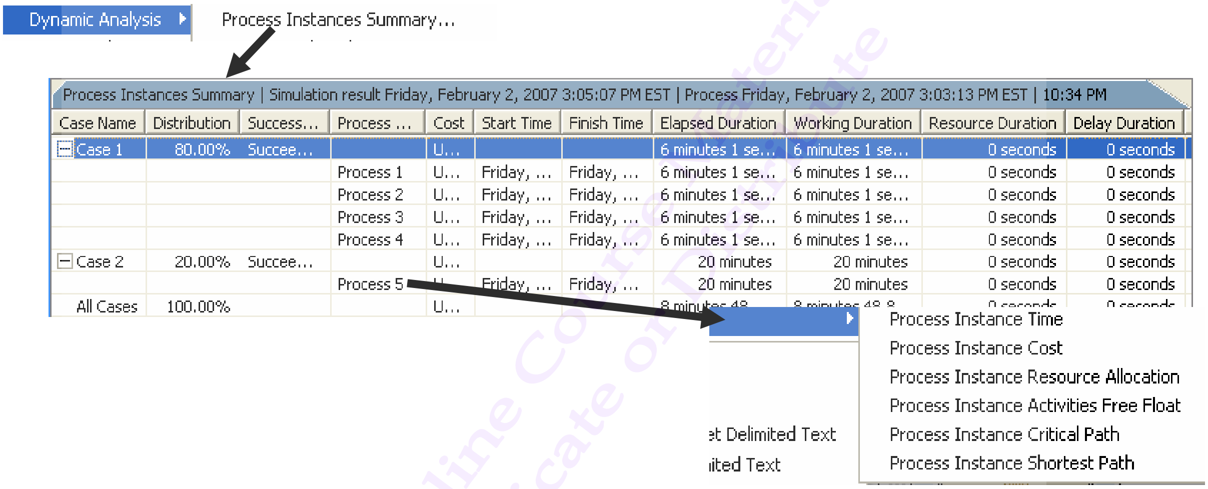
- Analyzing process cases summaries
  - Display summary information for each of the process cases produced during a simulation
- Analyzing process durations
  - Examine the average durations of all process cases
- Analyzing process activities total times
  - Determine the average total time values for all process instances
- Analyzing process costs
  - Examine the average costs, revenues, and profits for all process instances
- Analyzing classifier costs and durations
  - Show the costs and durations of activities associated with each classifier value used in a process

Figure 5-11. Process case analysis (2 of 2) VB1861.0

Notes:

Process instance analysis (1 of 2)

- Used to gain an understanding of the behavior of a specific token's run through the process
  - Get a detailed understanding of each individual pass through a process during simulation
- Process instance analyses are the most granular of the dynamic analyses
  - Use data from a single instance of a process case



Process Instances Summary | Simulation result Friday, February 2, 2007 3:05:07 PM EST | Process Friday, February 2, 2007 3:03:13 PM EST | 10:34 PM

Case Name	Distribution	Success...	Process ...	Cost	Start Time	Finish Time	Elapsed Duration	Working Duration	Resource Duration	Delay Duration
⊟ Case 1	80.00%	Succee...		U...			6 minutes 1 se...	6 minutes 1 se...	0 seconds	0 seconds
			Process 1	U...	Friday, ...	Friday, ...	6 minutes 1 se...	6 minutes 1 se...	0 seconds	0 seconds
			Process 2	U...	Friday, ...	Friday, ...	6 minutes 1 se...	6 minutes 1 se...	0 seconds	0 seconds
			Process 3	U...	Friday, ...	Friday, ...	6 minutes 1 se...	6 minutes 1 se...	0 seconds	0 seconds
			Process 4	U...	Friday, ...	Friday, ...	6 minutes 1 se...	6 minutes 1 se...	0 seconds	0 seconds
⊟ Case 2	20.00%	Succee...		U...			20 minutes	20 minutes	0 seconds	0 seconds
			Process 5	U...	Friday, ...	Friday, ...	20 minutes	20 minutes	0 seconds	0 seconds
All Cases	100.00%			U...			8 minutes 48	8 minutes 48 8	0 seconds	0 seconds

Process Instance Time
Process Instance Cost
Process Instance Resource Allocation
Process Instance Activities Free Float
Process Instance Critical Path
Process Instance Shortest Path
et Delimited Text
ited Text

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Figure 5-12. Process instance analysis (1 of 2) VB1861.0

Notes:

Process instance analysis (2 of 2)

- Analyzing process instance times
  - Display the durations of each of the activities involved in a process instance
- Analyzing process instance costs
  - Display detailed information about the cost and revenue for each activity within a process instance
- Analyzing process instance resource allocation
  - Obtain detailed information about the resources allocated to activities in a process instance
- Analyzing process instance activities free float
  - Display information about the available free float (slack time) periods associated with activities in a process instance
- Analyzing process instance critical paths
  - Display the path of longest duration within the process instance
- Analyzing process instance shortest paths
  - Display the path in a process instance that has the shortest duration of all parallel paths

Figure 5-13. Process instance analysis (2 of 2) VB1861.0

Notes:

Comparative analysis (1 of 3)

- Used to highlight differences and similarities in simulation results between two different simulation runs:
  - Different versions of a modeled process
  - Different simulation sizes
  - Different decision probabilities
- Compares the weighted average analysis results for two simulated processes that use the same input parameters
  - For example, compare the average length of time it takes to complete your current process versus your proposed future process.

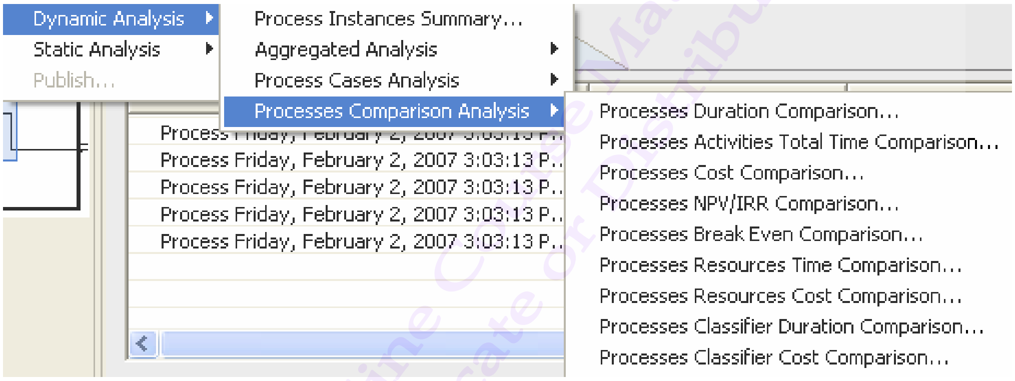

Dynamic Analysis
Static Analysis
Publish...
Process Instances Summary...
Aggregated Analysis
Process Cases Analysis
Processes Comparison Analysis
Processes Duration Comparison...
Processes Activities Total Time Comparison...
Processes Cost Comparison...
Processes NPV/IRR Comparison...
Processes Break Even Comparison...
Processes Resources Time Comparison...
Processes Resources Cost Comparison...
Processes Classifier Duration Comparison...
Processes Classifier Cost Comparison...
Process Friday, February 2, 2007 3:03:13 P..
Process Friday, February 2, 2007 3:03:13 P..
Process Friday, February 2, 2007 3:03:13 P..
Process Friday, February 2, 2007 3:03:13 P..
Process Friday, February 2, 2007 3:03:13 P..

Figure 5-14. Comparative analysis (1 of 3) VB1861.0

Notes:

Comparative analysis (2 of 3)

- Processes duration comparison analysis
  – Compares the average duration and throughput of two processes
- Processes activities total time comparison analysis
  – Compares the average duration of two processes
- Processes cost comparison analysis
  – Compares the average cost and revenue results
- Processes NPV and IRR comparison analysis
  – Compares process net present value (NPV) and internal rate of return (IRR) analysis results that use the same input parameters
- Processes break-even comparison analysis
  – Compares the break-even analysis results

Figure 5-15. Comparative analysis (2 of 3)

Notes:

Comparative analysis (3 of 3)

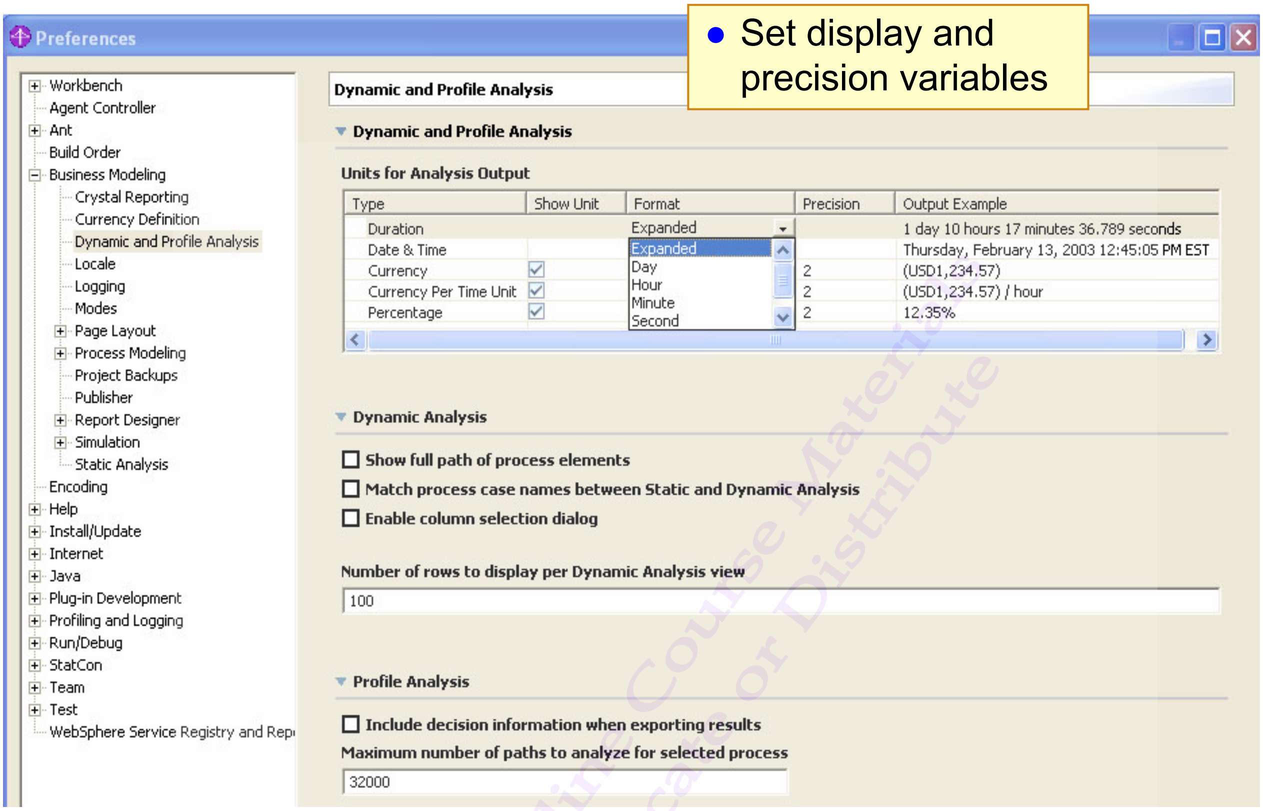
- Processes resources time comparison analysis
  - Compares the average resource allocation durations based on the same simulation snapshot
  - Can be results from different profiles, or two sets of results from the same profile
- Processes resources cost comparison analysis
  - Compares the average resource allocation costs based on the same simulation snapshot
  - Can be results from different profiles, or two sets of results from the same profile
- Processes classifier duration comparison analysis
  - Compares the average classifier elapsed duration results that use the same input parameters
- Processes classifier cost comparison analysis
  - Compares the average classifier cost results that use the same input parameters

Figure 5-16. Comparative analysis (3 of 3)

VB1861.0

Notes:

Dynamic analysis — preferences



- Set display and precision variables

Dynamic and Profile Analysis

Dynamic and Profile Analysis

Units for Analysis Output

Type	Show Unit	Format	Precision	Output Example
Duration		Expanded		1 day 10 hours 17 minutes 36.789 seconds
Date & Time				Thursday, February 13, 2003 12:45:05 PM EST
Currency	☑		2	(USD1,234.57)
Currency Per Time Unit	☑		2	(USD1,234.57) / hour
Percentage	☑		2	12.35%

Dynamic Analysis

☐ Show full path of process elements

☐ Match process case names between Static and Dynamic Analysis

☐ Enable column selection dialog

Number of rows to display per Dynamic Analysis view: 100

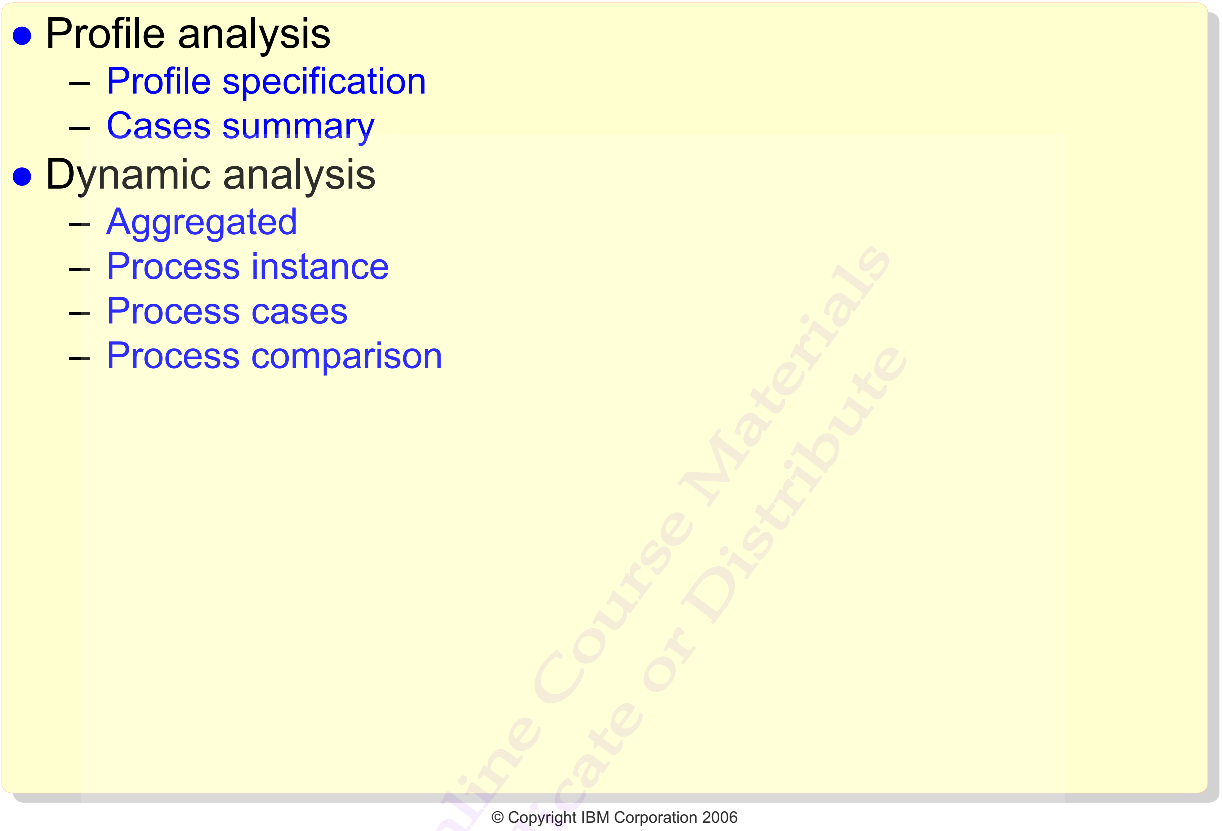
Profile Analysis

☐ Include decision information when exporting results

Maximum number of paths to analyze for selected process: 32000

Figure 5-17. Dynamic analysis — preferences VB1861.0

Notes:



Summary

- Profile analysis
  - Profile specification
  - Cases summary
- Dynamic analysis
  - Aggregated
  - Process instance
  - Process cases
  - Process comparison

Figure 5-18. Summary VB1861.0

Notes:

Exercise

- Creating profile analysis
- Dynamic analysis and aggregated analysis
- Dynamic analysis — process analysis
- Generating and exporting reports
- Setting up for simulation
- Running simulation and generating analysis

Figure 5-19. Exercise

VB1861.0

Notes:

Review questions

- What is profile specification?
- What is the function of process cases summary?
- What is dynamic analysis?
- Which analysis shows the differences and similarities in simulation results between two different simulation runs?

Figure 5-20. Review questions VB1861.0

Notes:

The solution can be found in the appendix of the Student Exercises.

Unit 6. Statistical distribution

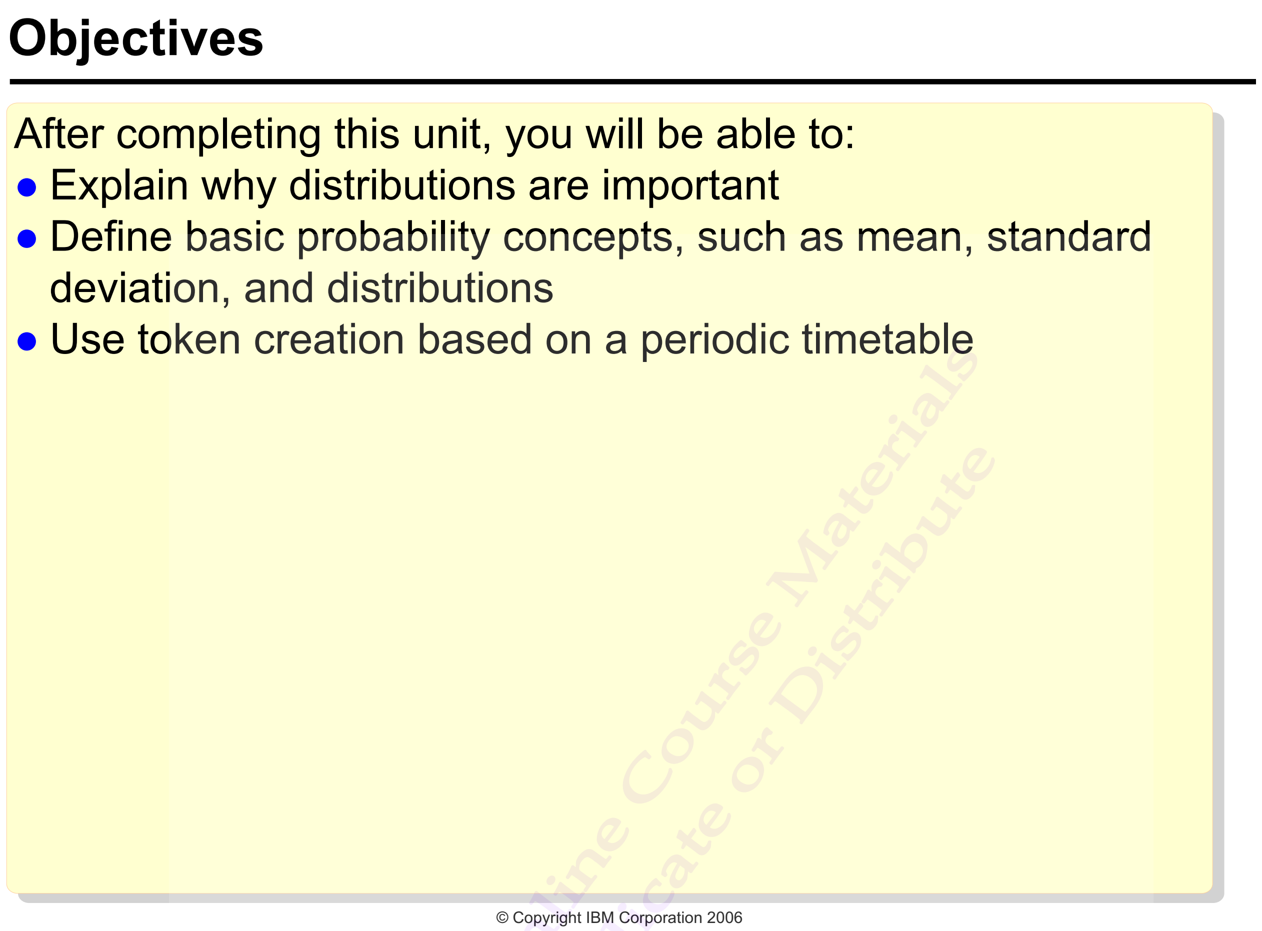
What this unit is about

This unit describes the statistical distribution.

What you should be able to do

After completing this unit, you should be able to:

- Explain why distributions are important
- Define basic probability concepts, such as mean, standard deviation, and distributions
- Use token creation based on a periodic timetable



Objectives

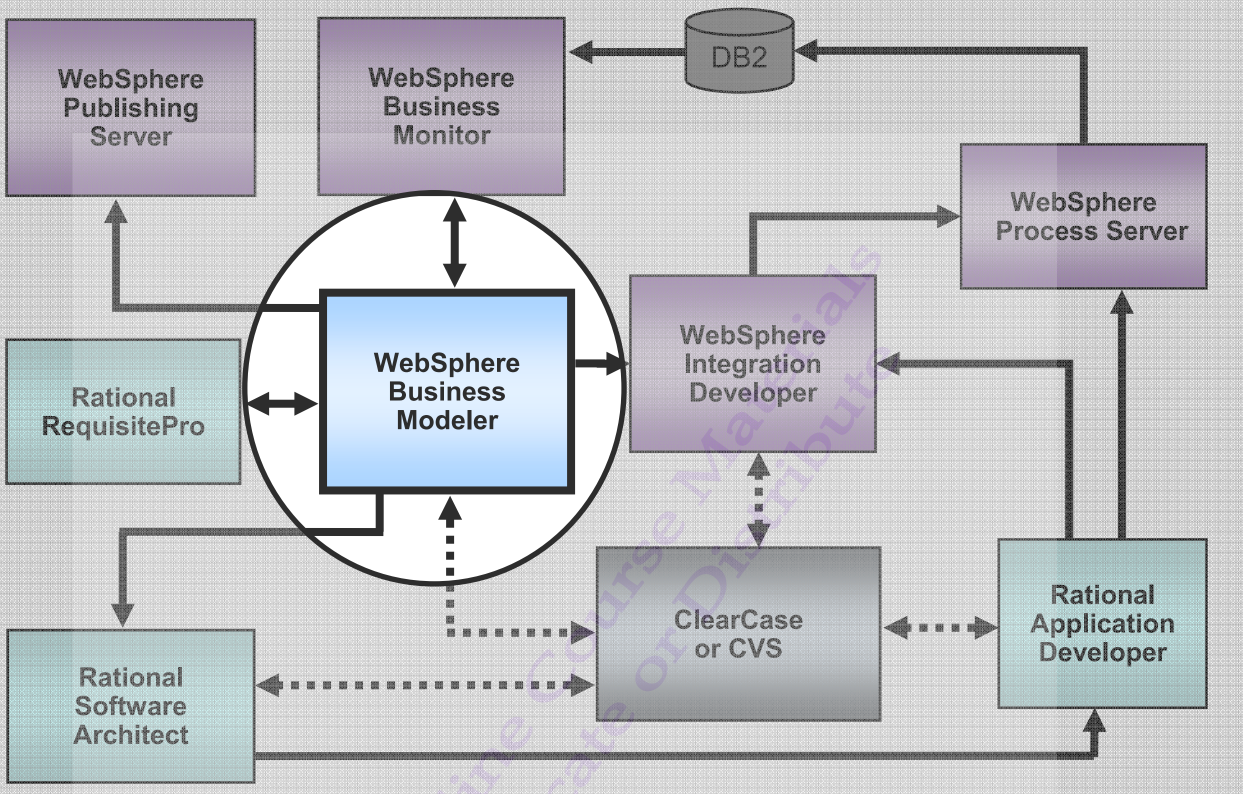
After completing this unit, you will be able to:

- Explain why distributions are important
- Define basic probability concepts, such as mean, standard deviation, and distributions
- Use token creation based on a periodic timetable

Figure 6-1. Objectives VB1861.0

Notes:

Creating and running simulation models



WebSphere Publishing Server

WebSphere Business Monitor

DB2

WebSphere Process Server

Rational RequisitePro

WebSphere Business Modeler

WebSphere Integration Developer

ClearCase or CVS

Rational Application Developer

Rational Software Architect

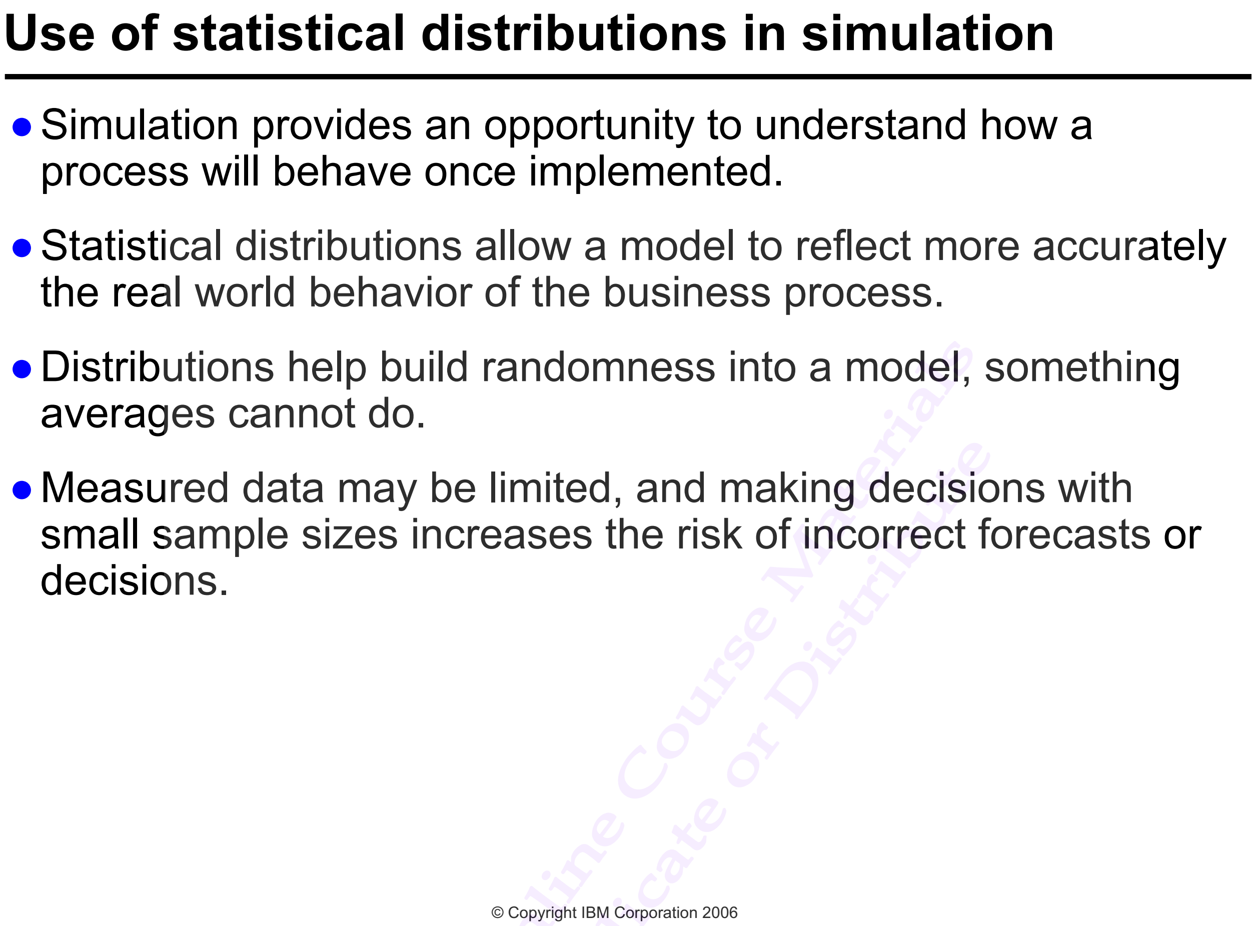
Figure 6-2. Creating and running simulation models VB1861.0

Notes:

Legend:

- - - - - - Version control flow (dashed line)

——— Development flow (solid line)

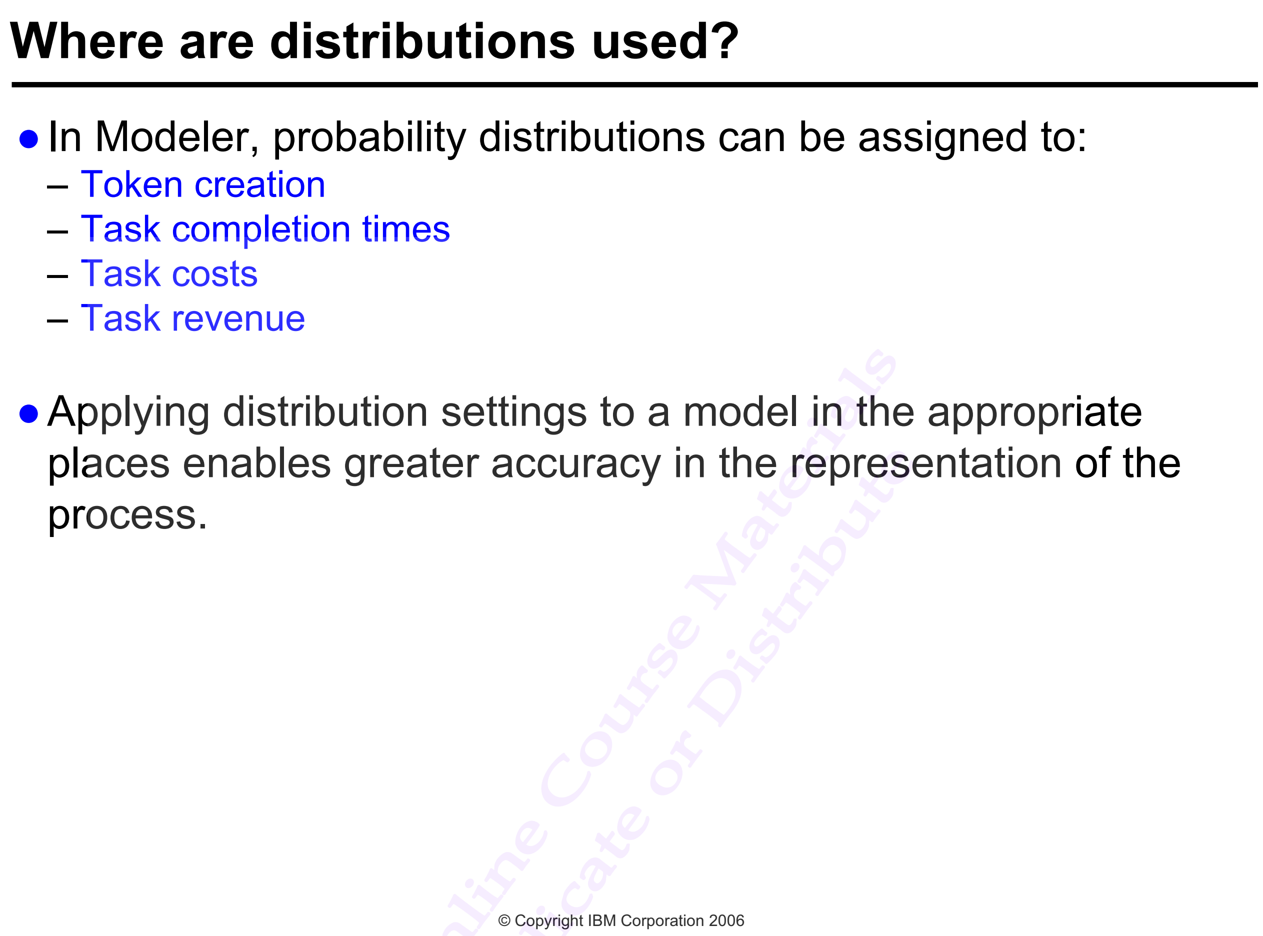


Use of statistical distributions in simulation

- Simulation provides an opportunity to understand how a process will behave once implemented.
- Statistical distributions allow a model to reflect more accurately the real world behavior of the business process.
- Distributions help build randomness into a model, something averages cannot do.
- Measured data may be limited, and making decisions with small sample sizes increases the risk of incorrect forecasts or decisions.

Figure 6-3. Use of statistical distributions in simulation VB1861.0

Notes:



Where are distributions used?

- In Modeler, probability distributions can be assigned to:
  - Token creation
  - Task completion times
  - Task costs
  - Task revenue

- Applying distribution settings to a model in the appropriate places enables greater accuracy in the representation of the process.

Figure 6-4. Where are distributions used? VB1861.0

Notes:

Definitions: Mean

In statistics, *mean* has two related meanings:

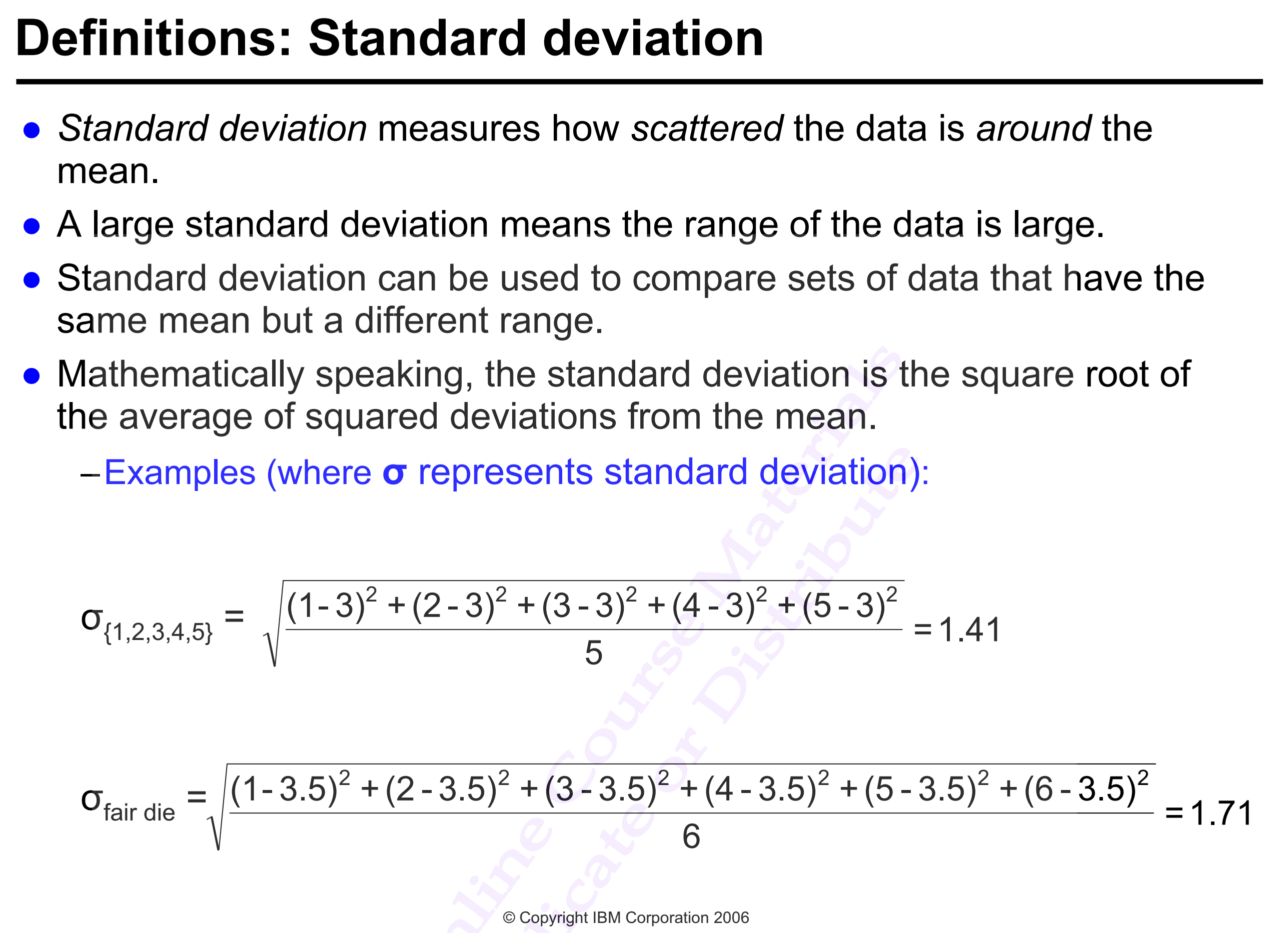
- *Arithmetic mean*, commonly known as *average*, is equal to the sum of all values divided by the total number of values.
  - Example*:*
    The mean of {1, 2, 3, 4, 5} is 3. [(1 + 2 + 3 + 4 + 5) / 5 = 3]
  - Often used as an estimator of the central tendency, such as the population mean

- In relation to probability, the *mean* is also known as *expected value* defined as the weighted sum of all possible outcomes.
  - Example*:*
    Expected value of rolling a fair die (each side has probability of 1/6)

$$\left(\frac{1}{6}\text{ x }1\right)+\left(\frac{1}{6}\text{ x }2\right)+\left(\frac{1}{6}\text{ x }3\right)+\left(\frac{1}{6}\text{ x }4\right)+\left(\frac{1}{6}\text{ x }5\right)+\left(\frac{1}{6}\text{ x }6\right)=3.5$$

Figure 6-5. Definitions: Mean VB1861.0

Notes:



Definitions: Standard deviation

- *Standard deviation* measures how *scattered* the data is *around* the mean.
- A large standard deviation means the range of the data is large.
- Standard deviation can be used to compare sets of data that have the same mean but a different range.
- Mathematically speaking, the standard deviation is the square root of the average of squared deviations from the mean.
  - Examples (where **σ** represents standard deviation):

$$\sigma_{\{1,2,3,4,5\}} = \sqrt{\frac{(1-3)^2 + (2-3)^2 + (3-3)^2 + (4-3)^2 + (5-3)^2}{5}} = 1.41$$

$$\sigma_{\text{fair die}} = \sqrt{\frac{(1-3.5)^2 + (2-3.5)^2 + (3-3.5)^2 + (4-3.5)^2 + (5-3.5)^2 + (6-3.5)^2}{6}} = 1.71$$

Figure 6-6. Definitions: Standard deviation VB1861.0

Notes:

Definitions: Standard deviation example

- Suppose your data forms a bell-shaped curve with μ = 0 (where **μ** represents the mean, or expected value)

- Bell-shaped curve with σ = 1
  - This curve covers a narrow range of x values (horizontal)
  - Data are tightly concentrated around the mean

- Bell-shaped curve with σ = 2
  - This curve is slightly wider about x value (horizontal)
  - Data are less concentrated and more spread out

- Bell-shaped curve with σ = 3
  - This curve shows an even greater spread about x value (horizontal)
  - Data are more scattered

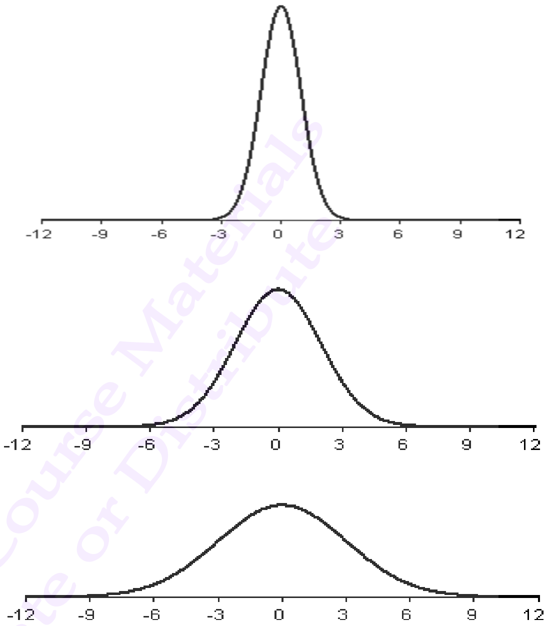
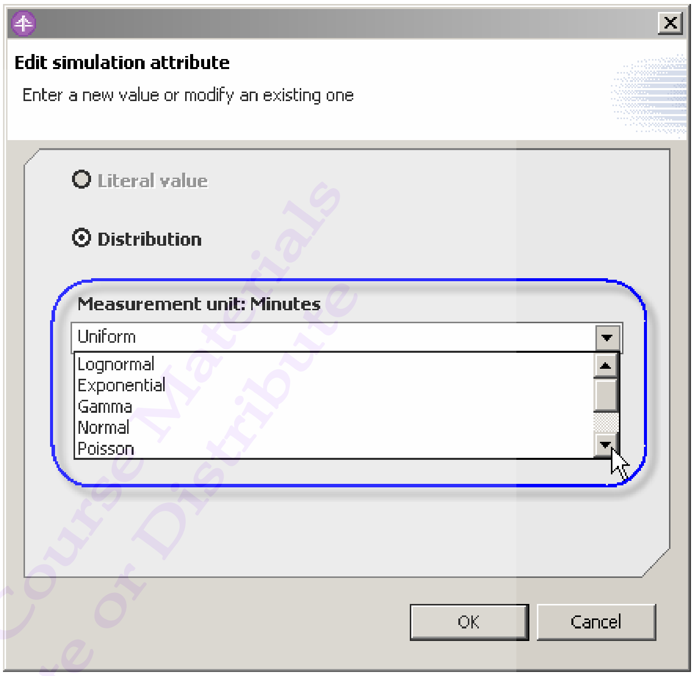


Figure 6-7. Definitions: Standard deviation example VB1861.0

Notes:

Distributions available in WebSphere Business Modeler

- **Beta**: Degree to which results can be believed to be valid
- **Continuous**: Values generated are evenly distributed
- **Erlang**: Useful for representing waiting times in queuing systems
- **Exponential**: Fits time-series data, like arrival times — a constant rate
- **Gamma**: Useful for continuous random variables constrained ≥ 0
- **Johnson**: Best fit distribution
- **Lognormal**: For random variables > 0
- **Normal**: Useful for a large variety and type of data
- **Poisson**: Used when probability is small and opportunities are large
- **Random list**: All equal probability
- **Triangular**: Defines most likely value
- **Uniform**: Distributes values evenly
- **Weibull**: Useful in modeling reliability
- **Weighted list**: Weighted probability for each value



Edit simulation attribute

Enter a new value or modify an existing one

○ Literal value

● Distribution

Measurement unit: Minutes

Uniform

Lognormal
Exponential
Gamma
Normal
Poisson

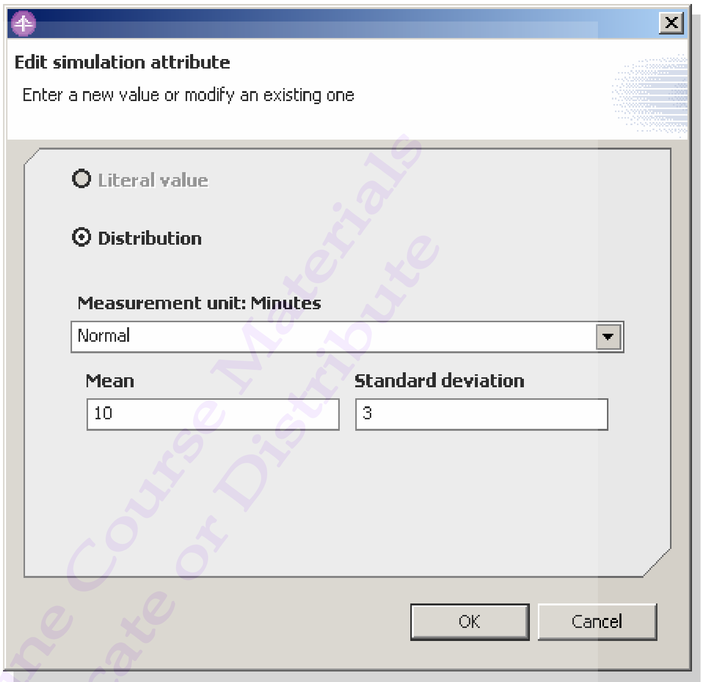
Figure 6-8. Distributions available in WebSphere Business Modeler VB1861.0

Notes:

Distribution parameters

- The settings that you can specify depend on the type of distribution you select, as shown in the following table:

Distribution type	Settings
Exponential	Mean
Gamma	Mean, Standard Deviation
Lognormal	Mean, Standard Deviation
Normal	Mean, Standard Deviation
Poisson	Mean
Uniform	Minimum, Maximum
Weighted list	Probabilities, Values
Random list	Values



Edit simulation attribute

Enter a new value or modify an existing one

○ Literal value

● Distribution

Measurement unit: Minutes

Normal

Mean: 10

Standard deviation: 3

Figure 6-9. Distribution parameters VB1861.0

Notes:

Distributions: Poisson

- The Poisson distribution models rates of occurrence.
- It is often used to model the number of events that occur when there is a large number of opportunities for an event but a small probability that the event occurs on each opportunity.

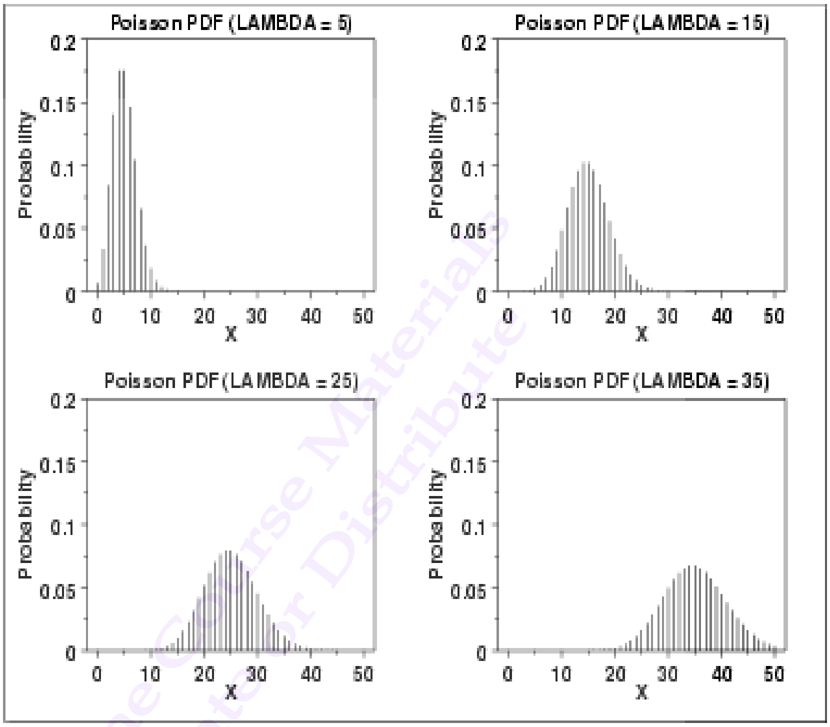


Figure 6-10. Distributions: Poisson

VB1861.0

Notes:

Distributions: Uniform

- The *uniform distribution* is a distribution that has constant probability for all values.
- The distribution is specified by two parameters: the minimum and the maximum values.

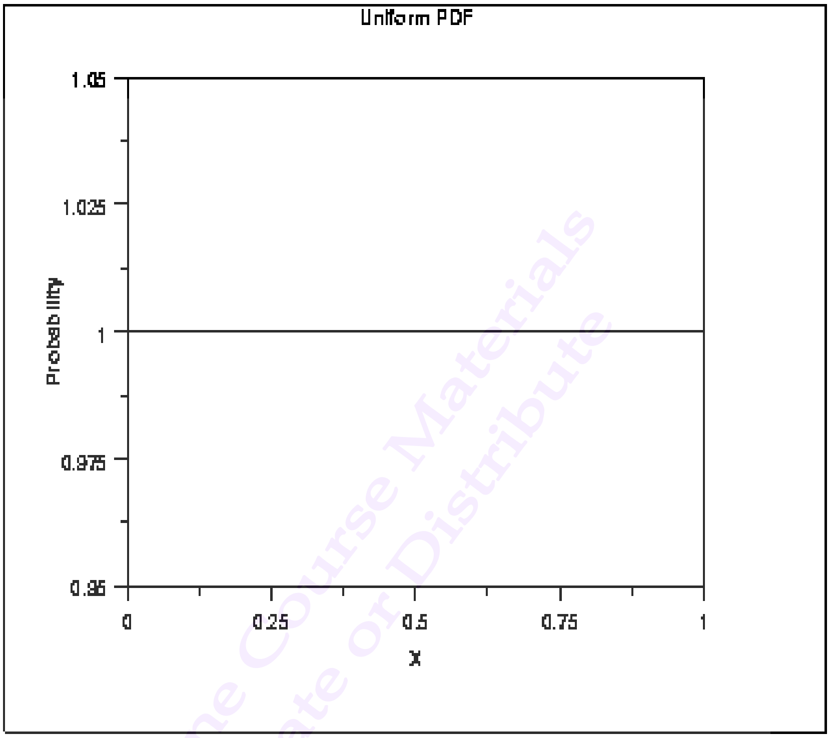


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Figure 6-11. Distributions: Uniform VB1861.0

Notes:

Distributions: Normal

- Sometimes described as bell-shaped, the *normal distribution* is symmetric with values more concentrated in the middle than in the tails.

- Many common attributes such as test scores, height, and so on, follow roughly normal distributions, with few members at the high and low ends and many in the middle.

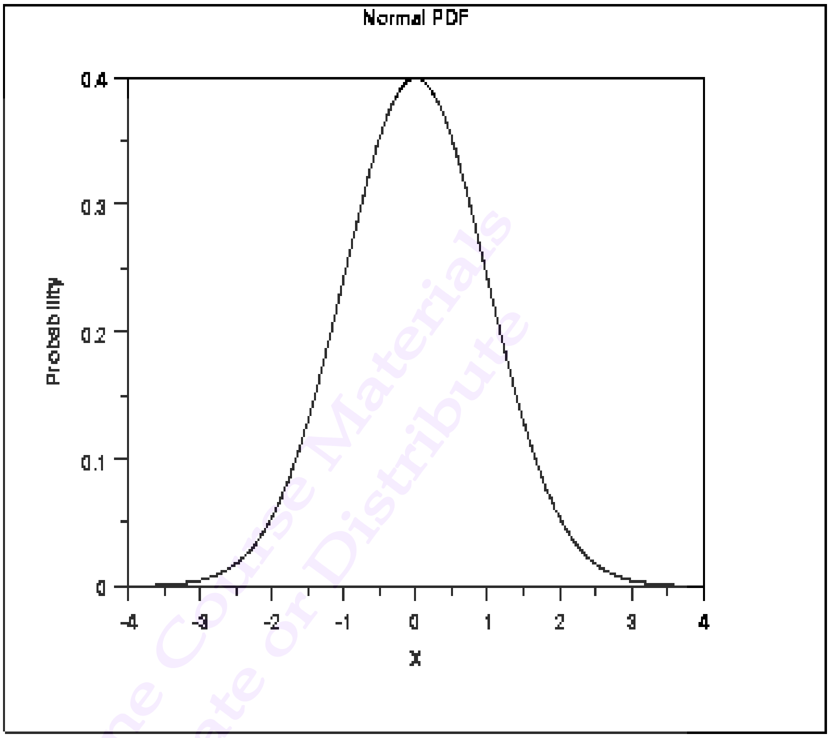
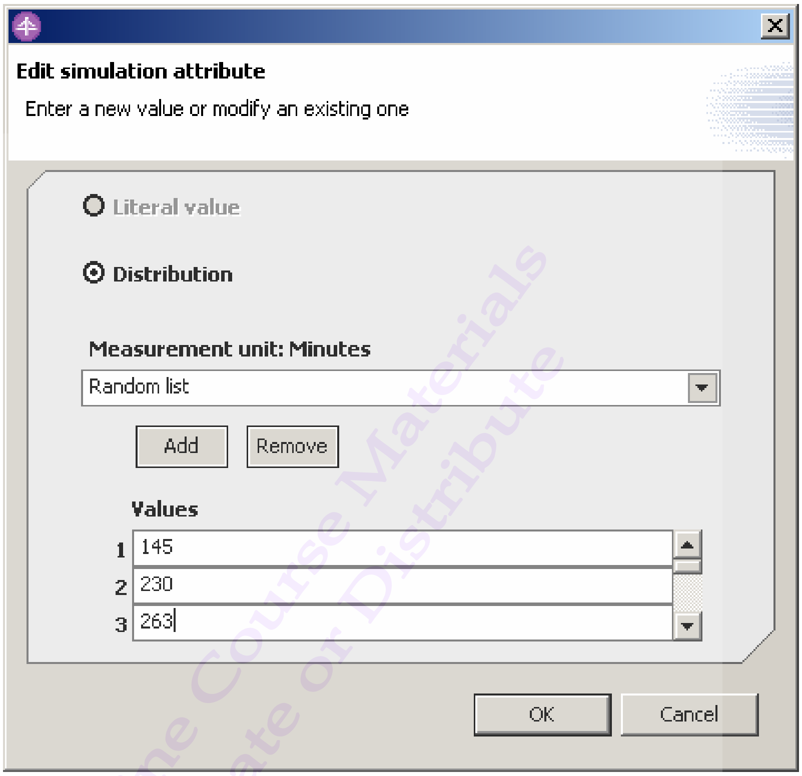


Figure 6-12. Distributions: Normal VB1861.0

Notes:

Distributions: Random list

- The *random list* option allows multiple values for each attribute to be specified, from which a selection will be made at random for the output.



Edit simulation attribute

Enter a new value or modify an existing one

○ Literal value

● Distribution

Measurement unit: Minutes

Random list

Values

1 145

2 230

3 263

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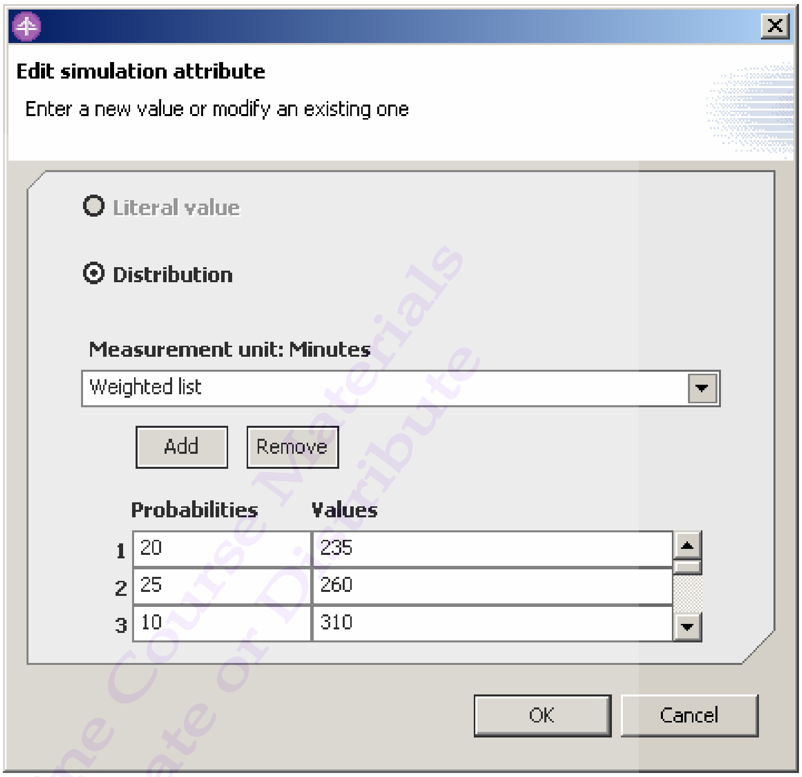
Figure 6-13. Distributions: Random list VB1861.0

Notes:

Distributions: Weighted list

- The *weighted list* option allows multiple values for each attribute to be specified, from which a selection will be made for the output according to probabilities that are assigned.



Edit simulation attribute

Enter a new value or modify an existing one

○ Literal value

● Distribution

Measurement unit: Minutes

Weighted list

	Probabilities	Values
1	20	235
2	25	260
3	10	310

Figure 6-14. Distributions: Weighted list VB1861.0

Notes:

Distributions: Exponential

- The exponential distribution is frequently used to describe random variables in queuing, service, and reliability systems.
- If arrivals in a queuing or service system form a *Poisson process*, then the interarrival times have an exponential distribution.
  - The Poisson process is a model for a completely random sequence of events in which each event has an equal probability of occurring in a small time interval.

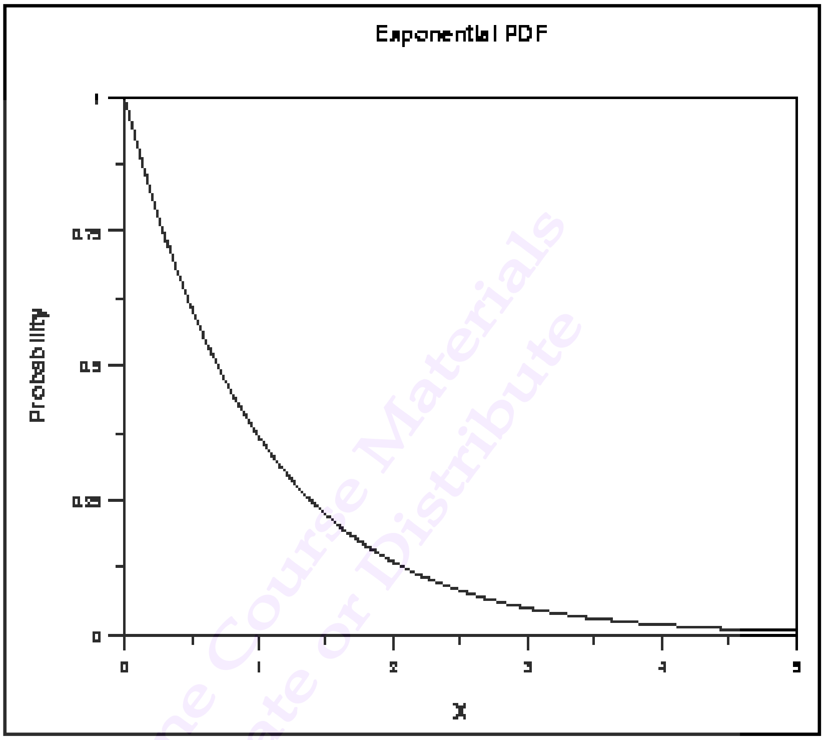


Figure 6-15. Distributions: Exponential

VB1861.0

Notes:

Distributions: Gamma

- The *gamma distribution* is a distribution relevant to, for example, waiting times.
- It can be used to model service times in queuing and service systems, equipment lifetimes, times between purchases of nondurable consumer goods, and machine repair times, among other phenomena.

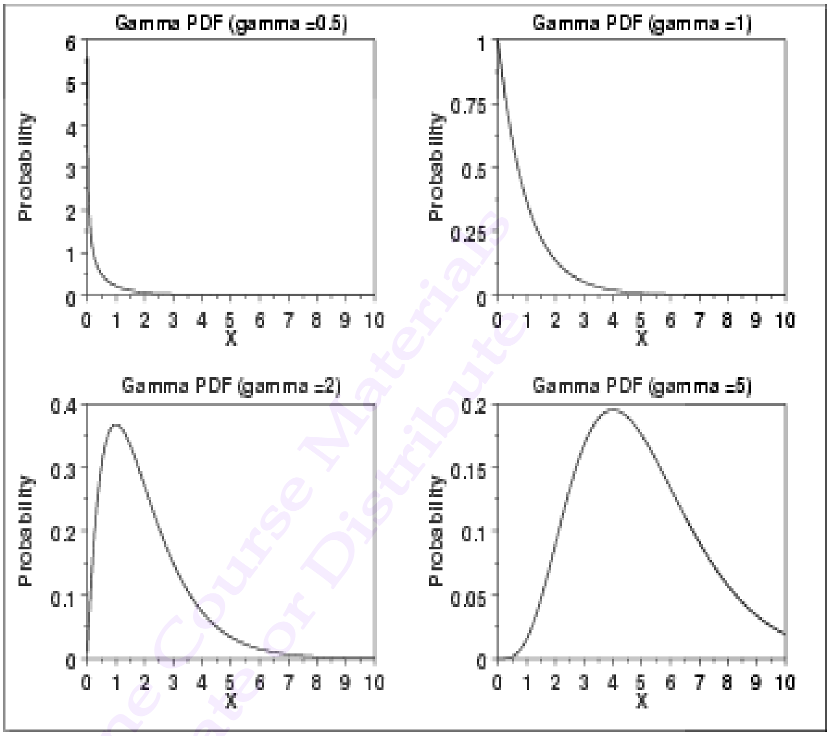


Figure 6-16. Distributions: Gamma

VB1861.0

Notes:

Distributions: Lognormal

- The *lognormal distribution* is useful when the raw data are highly skewed, whereas the natural log of the data are normally distributed. Stated differently, if **x** has a normal distribution, then $\mathbf{e}^{\mathbf{x}}$ has a lognormal distribution.
- This distribution is useful in describing some economic phenomena (for example, stock price changes) as well as some engineering phenomena (for example, lifetimes of equipment).

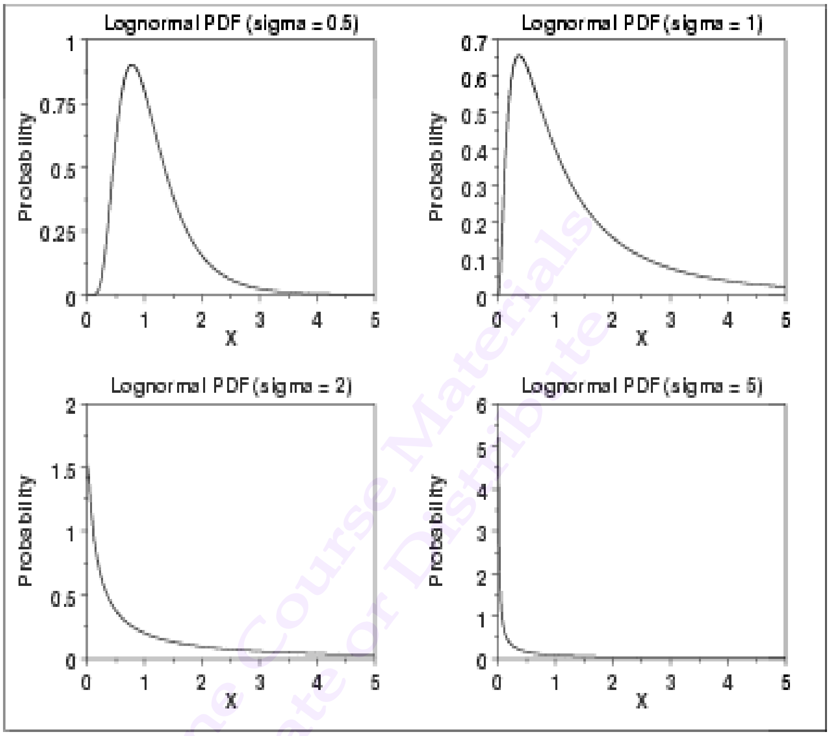
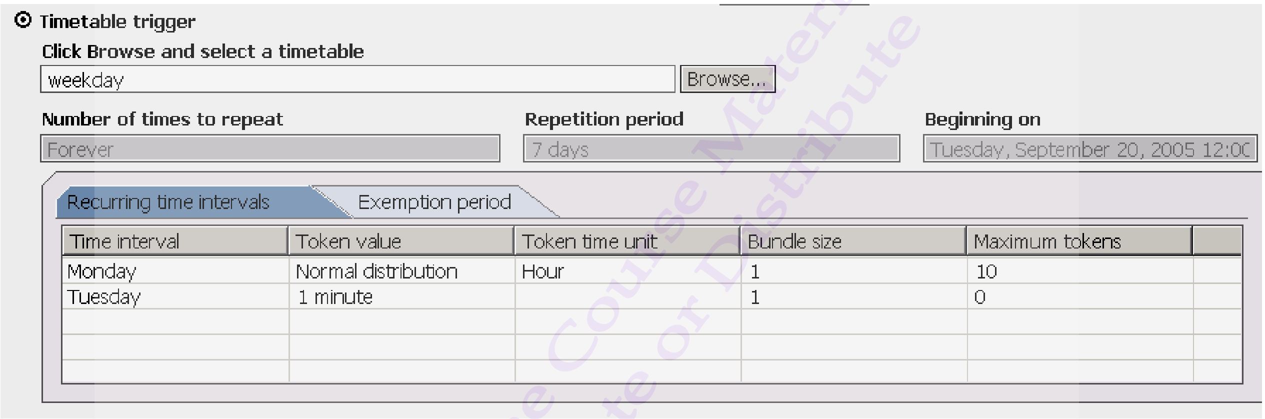


Figure 6-17. Distributions: Lognormal VB1861.0

Notes:

Token creation based on a periodic timetable (1 of 3)

- A specialized periodic timetable generates tokens for the model.
- Restrictions:
  - Only one timetable can be selected for each token creation setting.
  - The timetable cannot contain overlapping intervals.
    - These intervals will be filtered out from the available selection.
  - Only one level of exemption schedule is supported for selected timetables.
    - Subsequent levels of exemption will be ignored.



● Timetable trigger

Click Browse and select a timetable

weekday

Number of times to repeat	Repetition period	Beginning on
Forever	7 days	Tuesday, September 20, 2005 12:0C

Time interval	Token value	Token time unit	Bundle size	Maximum tokens
Monday	Normal distribution	Hour	1	10
Tuesday	1 minute		1	0

Specifying the timetable, and attributes for token creation

Figure 6-18. Token creation based on a periodic timetable (1 of 3) VB1861.0

Notes:

Token creation based on a periodic timetable (2 of 3)

- The timetable provides intervals available at the process start time.
- Tokens are discarded by a simulation when:
  - Scheduled time falls within the exemption period of the timetable
  - Scheduled before the interval's start time or after the end time
    - An interval can be generated with zero seconds
      - The time falls exactly at the start time of this interval (zero seconds offset).
- "Total number of tokens" in a simulation profile controls the number of process instances created.
  - Discarded tokens reduce the "Total number of tokens" within the interval.
  - If the number of tokens generated is less than "Total number of tokens," the next interval is located and generation continues.
- The schedule for tokens is controlled by the duration or random distribution function.

Figure 6-19. Token creation based on a periodic timetable (2 of 3) VB1861.0

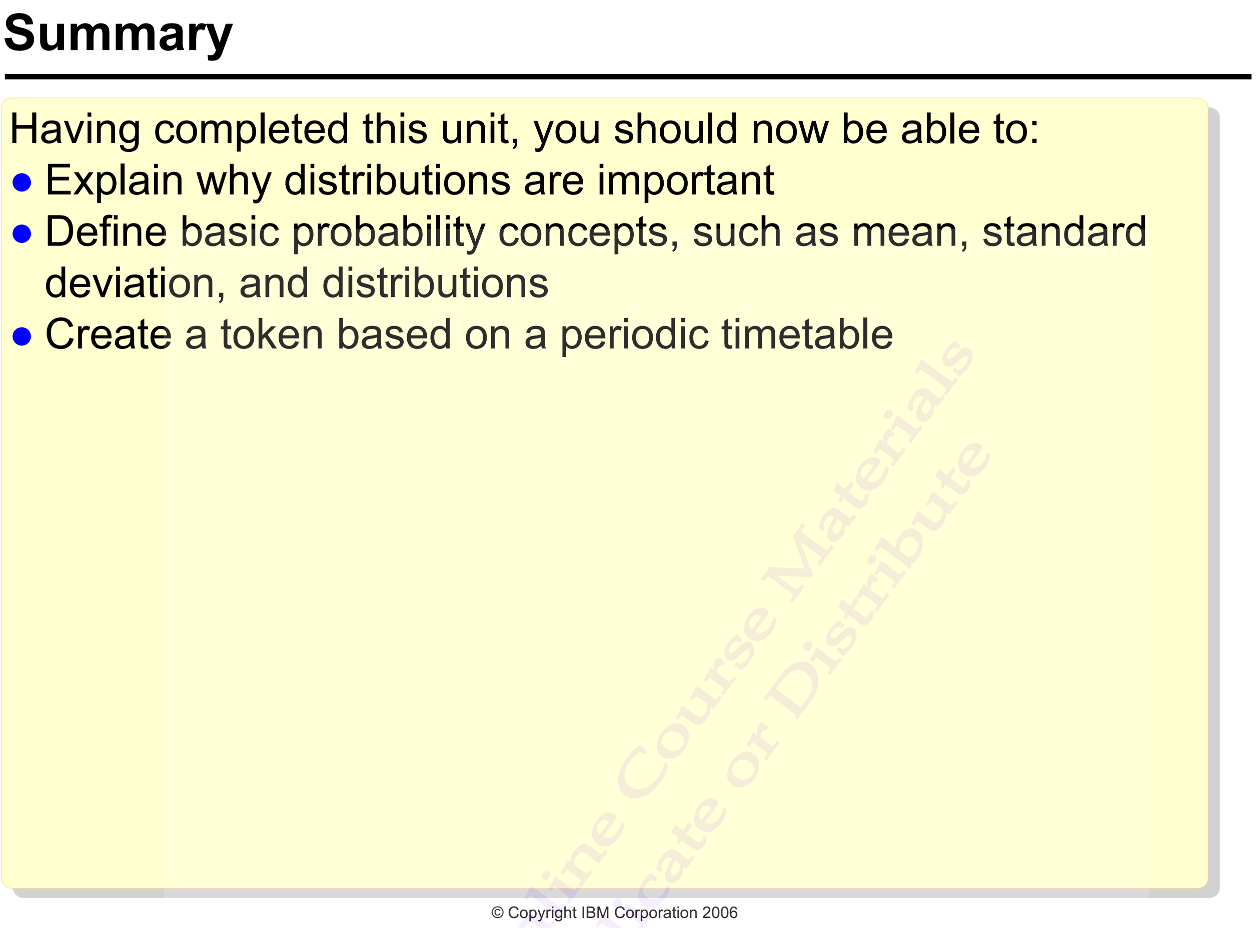
Notes:

Token creation based on a periodic timetable (3 of 3)

- The generation attempts to start at the time set in "Process availability begins" in general process attributes.
- The duration schedule starts at the interval's start time.
  - Continues to repeat at every duration period until interval's end time or maximum number of tokens is exceeded
- Example:
  - Interval start time = 9:00 a.m.
  - Duration = 1 minute
  - Tokens are generated at 9:00, 9:01, 9:02, 9:03 …
- The list or weighted list distribution elements provide an offset time from the start of the interval.
  - To enable token generation at the start time of the interval, include an element with zero time value (0 seconds, or 0 minutes).
  - Generation stops when the time to generate exceeds the "process availability ends" in the general process setting.

Figure 6-20. Token creation based on a periodic timetable (3 of 3) VB1861.0

Notes:



Summary

Having completed this unit, you should now be able to:

- Explain why distributions are important
- Define basic probability concepts, such as mean, standard deviation, and distributions
- Create a token based on a periodic timetable

Figure 6-21. Summary VB1861.0

Notes:

References

- BI862 *Process Integration Basics — Business Driven Development and Model Driven Dev* is a Web seminar deep dive on distributions.
- D. Vose, *Risk Analysis: A Quantitative Guide*, second edition. UK: John Wiley & Sons. 2000.
- F.W. Breyfogle III, *Implementing Six Sigma: Smarter Solutions Using Statistical Methods*, second edition. US: John Wiley & Sons. 2003.
- Grover, Varun, and William A. Kettinger. *Business Process Change: Re-engineering Concepts, Methods and Technologies*. Hershey, PA: Idea Group Publishing, 1998.
- Harrington, H. James, and Kerim Tumay. *Simulation Modeling Methods: To Reduce Risks and Increase Performance*. New York: McGraw Hill, 2000.
- S.M. Ross, *Introduction to Probability Models*, eighth edition. Orlando, FL: Academic Press, 2003.

Figure 6-22. References VB1861.0

Notes:

Exercise

In this exercise, you use the credit request process to:

- Set simulation attributes
- Perform simulations with distribution parameters
- Perform dynamic analysis

Figure 6-23. Exercise VB1861.0

Notes:

Review questions

- What is the advantage of using statistical distributions in simulation?
- Where are probability distributions used in the Modeler?
- In which distribution does it assign a constant probability for all values?
- What are the restrictions when using token creation based on a periodic timetable?

Figure 6-24. Review questions VB1861.0

Notes:

The solution can be found in the appendix of the Student Exercises.

Unit 7. Process improvement

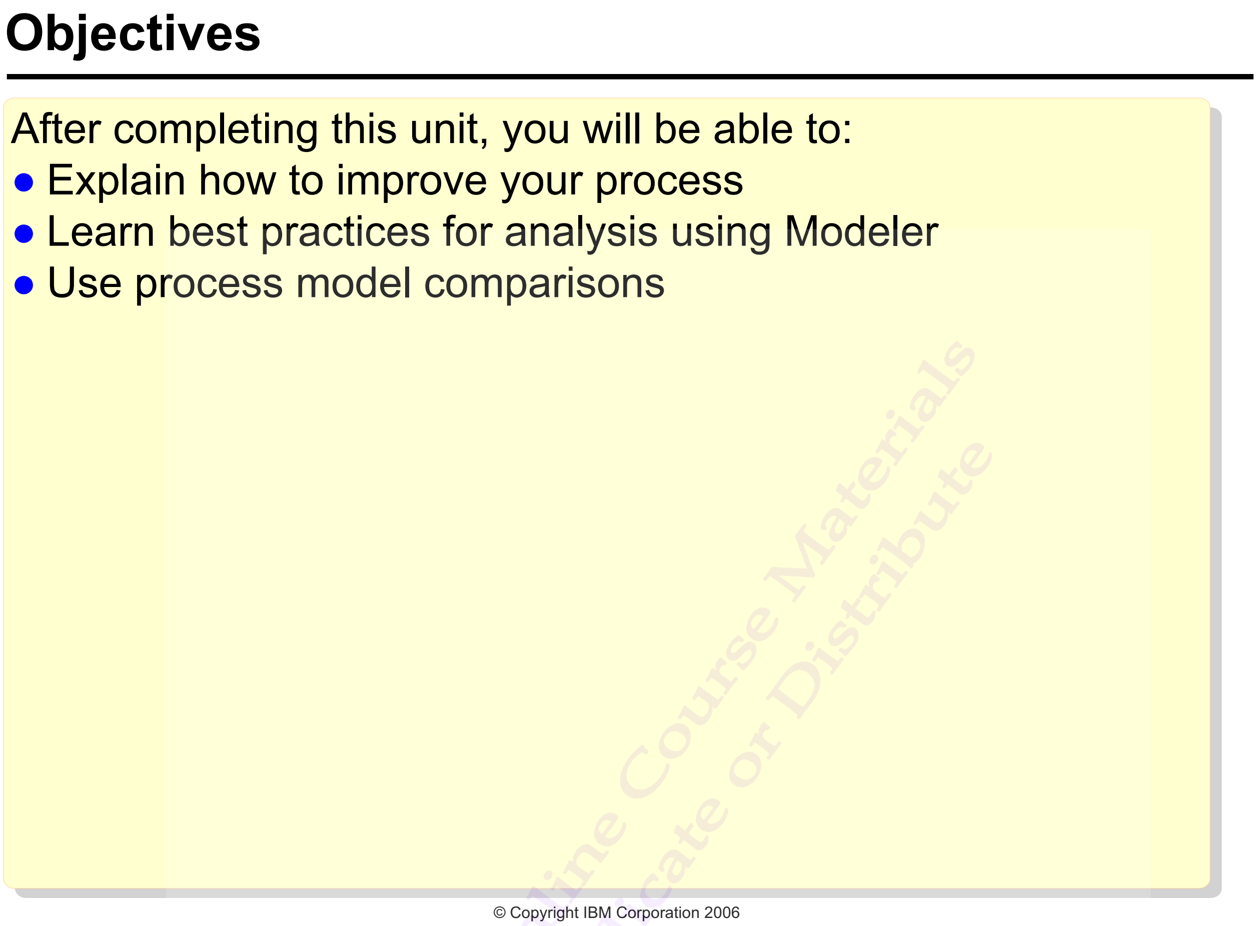
What this unit is about

This unit describes the process improvement.

What you should be able to do

After completing this unit, you should be able to:

- Describe how to improve your process
- Discuss best practices for analysis using Modeler
- Use process model comparisons



Objectives

After completing this unit, you will be able to:

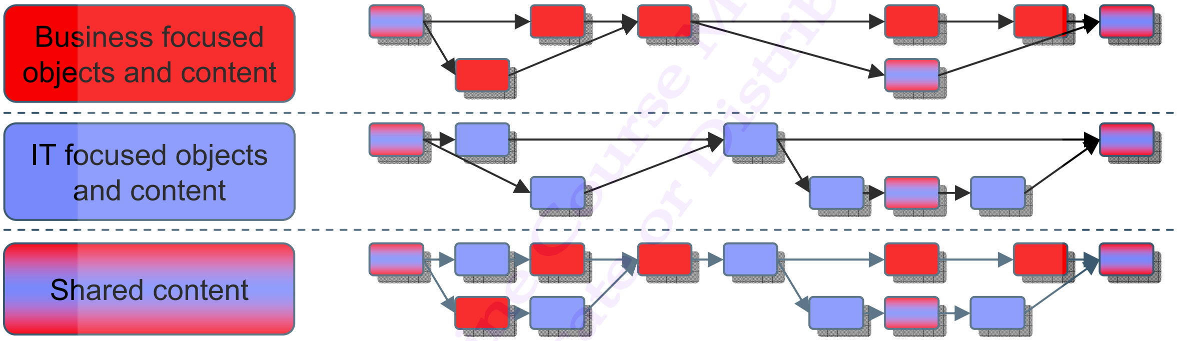
- Explain how to improve your process
- Learn best practices for analysis using Modeler
- Use process model comparisons

Figure 7-1. Objectives VB1861.0

Notes:

Audience perspectives

- To evaluate alternative solutions, it is necessary to understand the audience perspectives of model content.
- Content relates to the process objects and the data contained in each object.
- A company executive may not need to see detailed task interactions with various applications, as would a software architect.
  - However, the data needs to be in Modeler’s repository.
    - Modeler provides for this using subprocesses and in setting the operational mode.
  - Model content should reflect the needs of the intended audience.
  - Models can store content for multiple audiences, so filter the content for a presentation to reduce or avoid confusing a specific audience.



Business focused objects and content

IT focused objects and content

Shared content

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Figure 7-2. Audience perspectives VB1861.0

Notes:

Comprehensive model

- Evaluation of all alternative solutions requires understanding the comprehensive model.
- Comprehensive models contain shared content and shared process flows.
  - Model diagram (process flow) represents tasks for people and systems, their inputs and outputs, and the decisions that direct the flow of the key business item.
  - Model elements contain data which is relevant to both business and technology.
- Process re-engineering requires the analysis of:
  - Business
  - People
  - Process
  - Technology

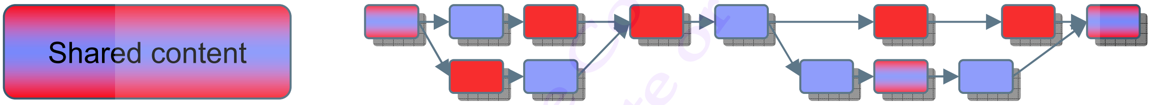
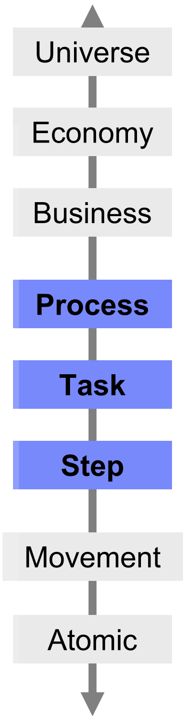


Figure 7-3. Comprehensive model VB1861.0

Notes:

Balance of content versus level of detail

- Content refers to the data collected about each process object.
  - Summary content may include task name and the role of the person responsible for its execution.
  - Detailed content might include: task name, role, duration, cost, application resources, bulk resources, departmental structure, inputs.
- Level of detail refers to how the process is described.
  - A high level of detail for sending a letter could be a task:
    - “Send letter.”
  - At a lower level of detail:
    - Fold completed letter.
    - Place in envelope.
    - Seal envelope.
    - Address and stamp envelope.
    - Deliver to mailbox.



One task may represent five steps from a lower level of detail.

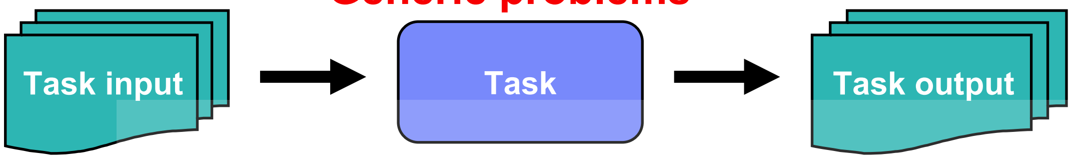
Figure 7-4. Balance of content versus level of detail VB1861.0

Notes:

Successful evaluation of the alternatives also requires a balance of content versus level of detail.

Most desirable solution

Generic problems



- Input issues
  - Wrong data
  - Insufficient data
  - Incorrect timing
  - Wrong format

- Task
  - Duration too long
  - Cost too high
  - Role unavailable
  - Role not qualified or overqualified
  - Too much volume
  - Resources unavailable
  - Business rules not aligned

- Task output
  - Incomplete or incorrect business item
  - Incorrect timing for next task
  - Medium too slow
  - Output sent to wrong next step

Input issues may be the true root cause for task problems

Output issues become the input problem and cause for the next task

Figure 7-5. Most desirable solution VB1861.0

Notes:

The most desirable solution may be too aggressive and attempt to address too many of the process problems.

Business issues important to the goals

- Business processes break down for a number of reasons; many of them are hidden and difficult to isolate.
- A model can reduce process complexity by highlighting areas with known problems when the model is constructed, including:
  - Multiple iterations
  - High costs
  - Long process delays
  - Limited or too many resources
  - Bottlenecks

Figure 7-6. Business issues important to the goals VB1861.0

Notes:

The best alternative is a based on a modeling that isolates business issues which are most important to the goals.

Future process model

- The diagram illustrates how each model becomes the foundation for the next phase.
  - The structural model facilitates the documentation of the current state, models are analyzed, results are published, and so on.

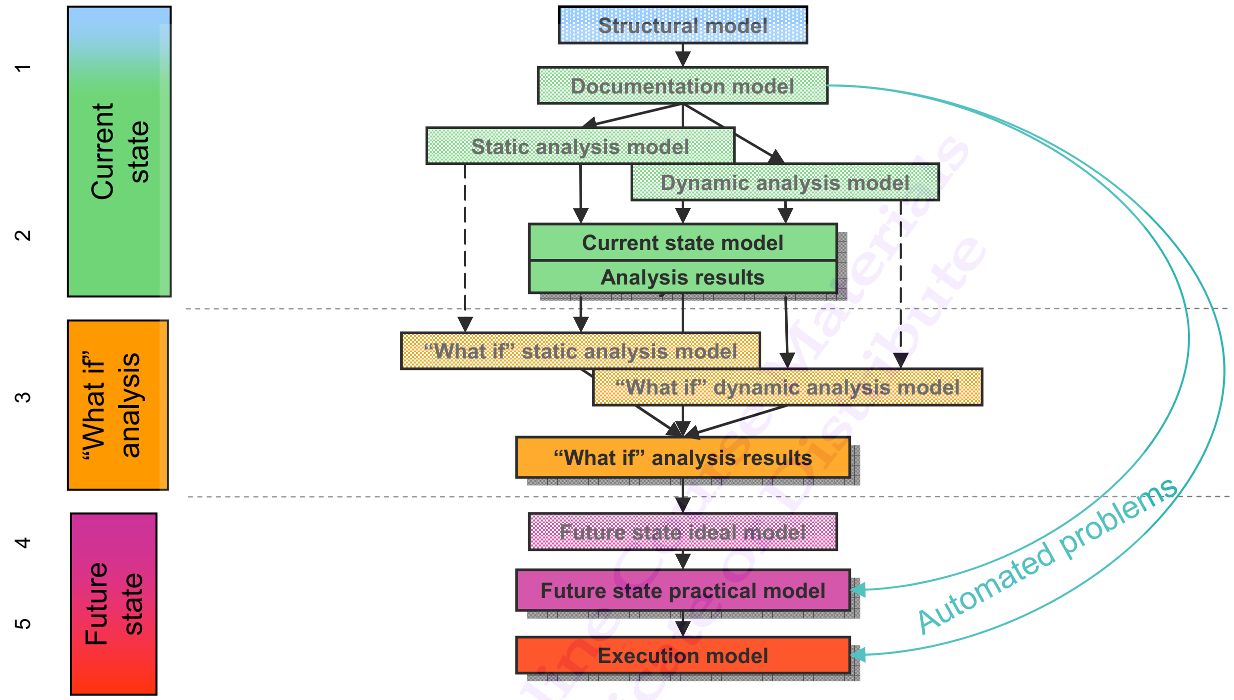


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Figure 7-7. Future process model VB1861.0

Notes:

The final future process model will be selected in the later phases of the project

Boxes in bold are deliverables for each phase.

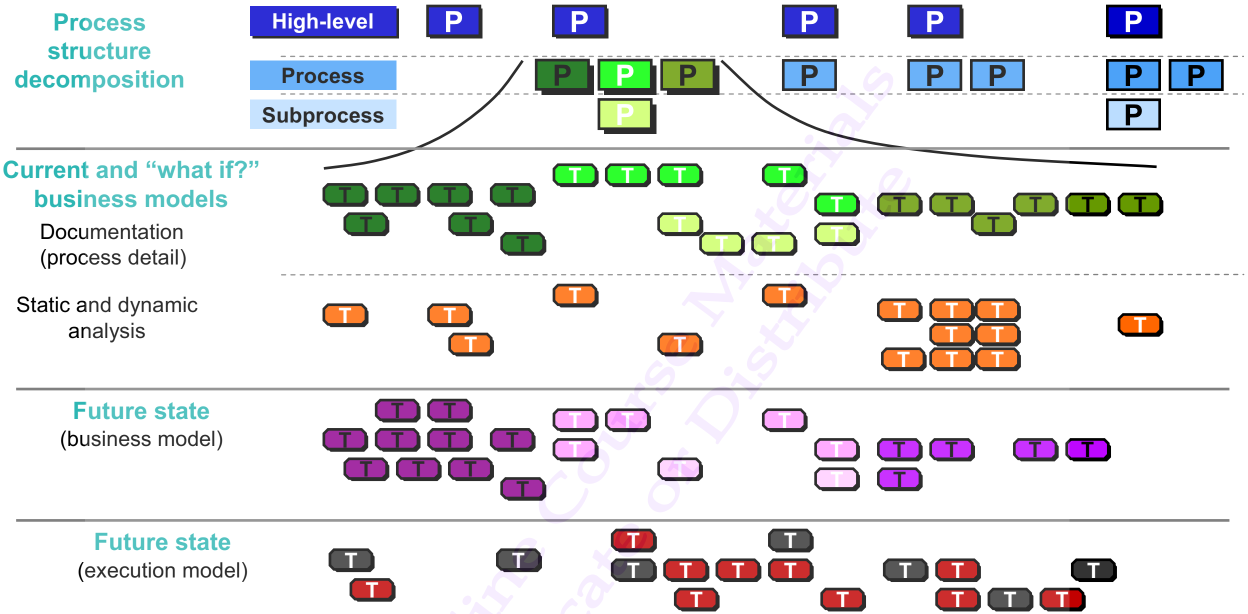
This diagram shows that each of the model iterations or versions is the foundation for future model iterations or versions.

The reveal shows "Automated Problems" if you skip from current state process identification straight to the future state business and execution models without performing any analysis.

There is actually some analysis in future state as well, although it is not shown.

Process model phases: Task details

- The flow below describes the same set of processes at different points in the life cycle.
  - As a process is refined through its life cycle, the emphasis on certain process details may shift.
  - The tasks and content defined for a business owner may be less relevant to an IT solution lead developing workflow.



Process structure decomposition

High-level

Process

Subprocess

Current and "what if?" business models

Documentation (process detail)

Static and dynamic analysis

Future state (business model)

Future state (execution model)

Business measures model

Figure 7-8. Process model phases: Task details VB1861.0

Notes:

In this example, you take a single end-to-end process (identified at the high level in line one) and break it down.

In the first two lines, it becomes three processes and a subprocess.

In current state onwards, you see the processes broken down into tasks.

In current state analysis, you decide to focus on the back end of the process, and so break out those tasks into more detail. At the front end of the process, you aggregate the tasks into a higher level view as you are not interested in analyzing this part. You can have a process where there are tasks at different levels of detail in the same model, depending on what information is required for analysis.

In the future state, you see that by putting some extra manual effort up front in the process, you can solve the problems you were having at the end.

In the execution model, you see that the back end of the process is now automated, as the complexity is removed by spending the manual effort up front in the process.

In the business measures model (white), you see the points at the beginning and ends of pieces of work where you want to capture metrics.

Business analysis components

- **Process goals**: the purpose of the project or process
- **Metrics**: process analysts identify what to capture in the model
  - What the model needs to produce for reporting and analysis
- **Proficiencies**: identify what the process and participants do well
- **Pain points**: provide focus for model creation and analysis
  - Model should be able to prove or disprove these claims though the quantification of the process data

Process goals • Reduce the cost of a claim • Meet corporate financial goals • Satisfy customer through improved cycle time • Reduce rework • Reduce mistakes and improve data integrity	**Metrics** • Percent of time claim is approved • Percent of time credit information is inaccurate • Percent of time rework is required • Overall process time and cycle time
Proficiencies • Experienced team • Openness to critique and change • Process flexibility • Claims	**Pain points** • High-level direction not adequate • Client information is duplicated • Cost tables are inconsistent • Reporting needs improvement • Need collaboration between underwriting and billing

Figure 7-9. Business analysis components VB1861.0

Notes:

Sample business analysis

- Process overview (work steps)
  - 198 steps in the product development process
    - 171 internal activities
    - 27 external activities

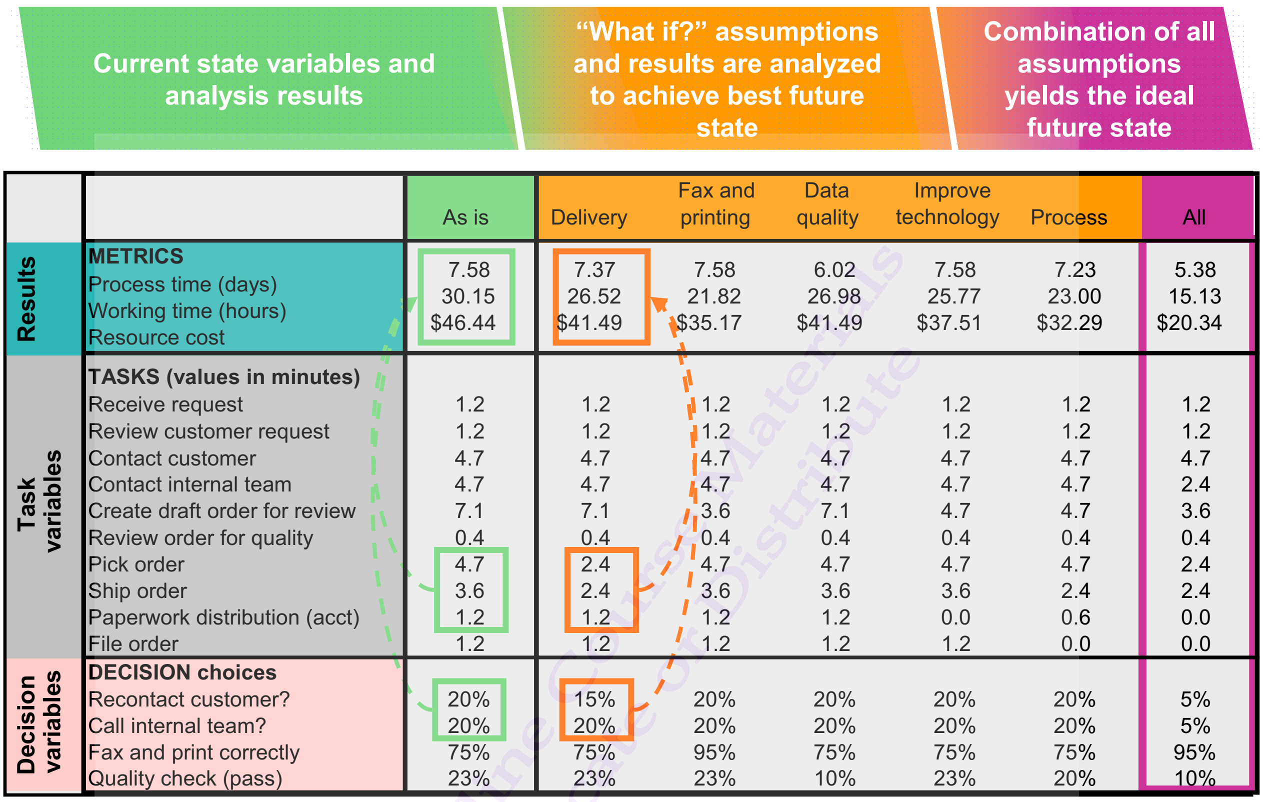
- Task classification
  - 35% of steps add value to the product
  - 50% are related to data entry
  - 35% are related to tracking information or products
  - 32% are approval tasks

- Information (inputs and outputs)
  - 73 pieces of information are used in the process.
    - Documents, spreadsheets, reports, bill of materials, hardware
  - This information is handed off 387 times.
  - On average, each piece of information is moved about five times.

Figure 7-10. Sample business analysis VB1861.0

Notes:

Sample “what if? ” scenarios



Current state variables and analysis results

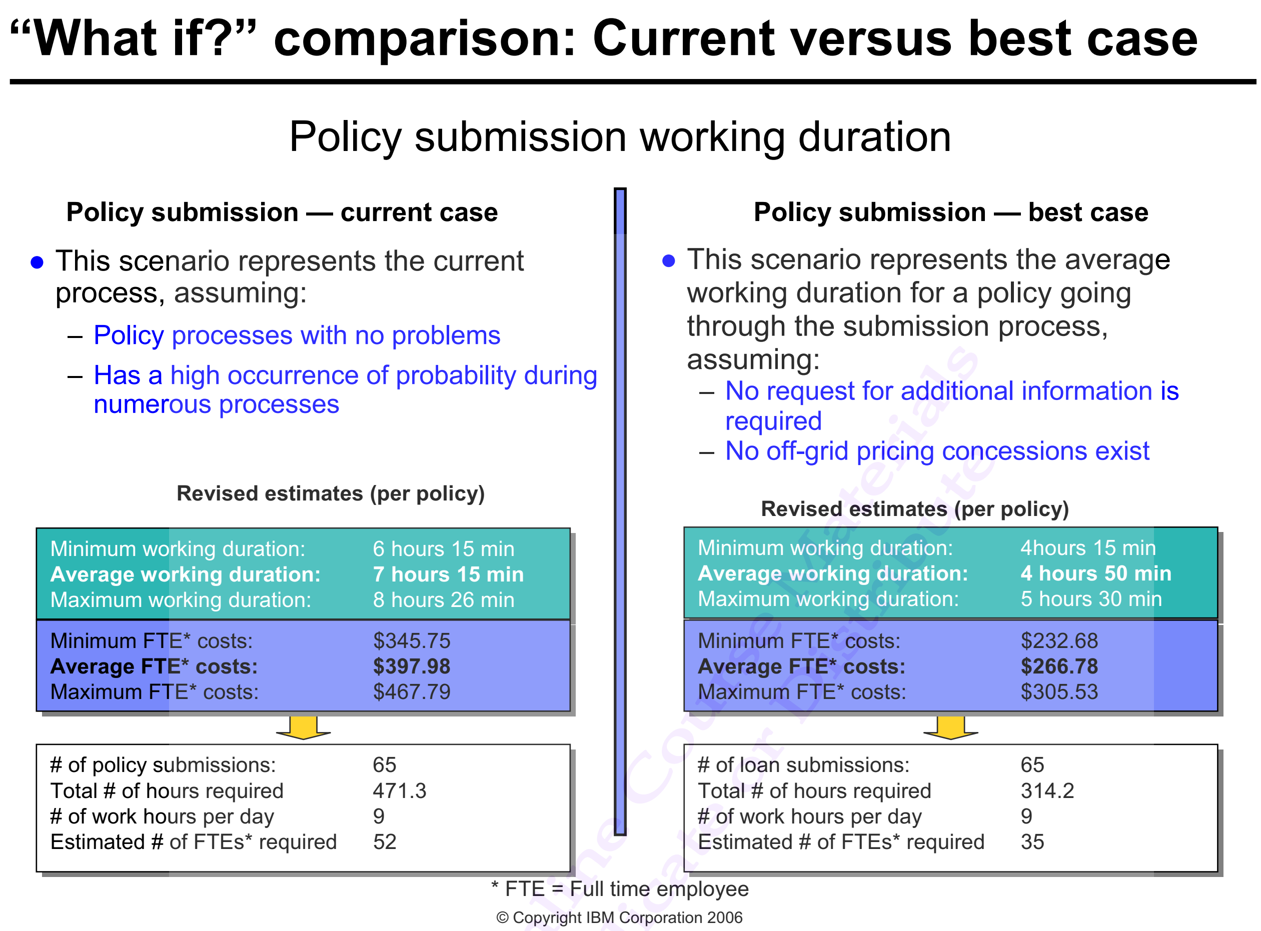
“What if?” assumptions and results are analyzed to achieve best future state

Combination of all assumptions yields the ideal future state

		As is	Delivery	Fax and printing	Data quality	Improve technology	Process	All
Results	**METRICS**							
	Process time (days)	7.58	7.37	7.58	6.02	7.58	7.23	5.38
	Working time (hours)	30.15	26.52	21.82	26.98	25.77	23.00	15.13
	Resource cost	$46.44	$41.49	$35.17	$41.49	$37.51	$32.29	$20.34
Task variables	**TASKS (values in minutes)**							
	Receive request	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	Review customer request	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	Contact customer	4.7	4.7	4.7	4.7	4.7	4.7	4.7
	Contact internal team	4.7	4.7	4.7	4.7	4.7	4.7	2.4
	Create draft order for review	7.1	7.1	3.6	7.1	4.7	4.7	3.6
	Review order for quality	0.4	0.4	0.4	0.4	0.4	0.4	0.4
	Pick order	4.7	2.4	4.7	4.7	4.7	4.7	2.4
	Ship order	3.6	2.4	3.6	3.6	3.6	2.4	2.4
	Paperwork distribution (acct)	1.2	1.2	1.2	1.2	0.0	0.6	0.0
	File order	1.2	1.2	1.2	1.2	1.2	0.0	0.0
Decision variables	**DECISION choices**							
	Recontact customer?	20%	15%	20%	20%	20%	20%	5%
	Call internal team?	20%	20%	20%	20%	20%	20%	5%
	Fax and print correctly	75%	75%	95%	75%	75%	75%	95%
	Quality check (pass)	23%	23%	23%	10%	23%	20%	10%

Figure 7-11. Sample “what if?” scenarios VB1861.0

Notes:



“What if?” comparison: Current versus best case

Policy submission working duration

Policy submission — current case

- This scenario represents the current process, assuming:
  - Policy processes with no problems
  - Has a high occurrence of probability during numerous processes

Revised estimates (per policy)

Minimum working duration:	6 hours 15 min
Average working duration:	**7 hours 15 min**
Maximum working duration:	8 hours 26 min
Minimum FTE* costs:	$345.75
Average FTE* costs:	**$397.98**
Maximum FTE* costs:	$467.79

# of policy submissions:	65
Total # of hours required	471.3
# of work hours per day	9
Estimated # of FTEs* required	52

Policy submission — best case

- This scenario represents the average working duration for a policy going through the submission process, assuming:
  - No request for additional information is required
  - No off-grid pricing concessions exist

Revised estimates (per policy)

Minimum working duration:	4hours 15 min
Average working duration:	**4 hours 50 min**
Maximum working duration:	5 hours 30 min
Minimum FTE* costs:	$232.68
Average FTE* costs:	**$266.78**
Maximum FTE* costs:	$305.53

# of loan submissions:	65
Total # of hours required	314.2
# of work hours per day	9
Estimated # of FTEs* required	35

* FTE = Full time employee

Figure 7-12. “What if?” comparison: Current versus best case VB1861.0

Notes:

It presents a “what if?” comparison, and it compares the current versus best case.

A case for change

- Deciding what to present to build a case for change
- Expansion versus decomposition
  - Expand the high-level diagram or decompose it?
  - Or use a combination of expansion and decomposition?

Figure 7-13. A case for change

VB1861.0

Notes:

Expansion versus decomposition: High level

- The high-level perspective provides a contextual end-to-end diagram.

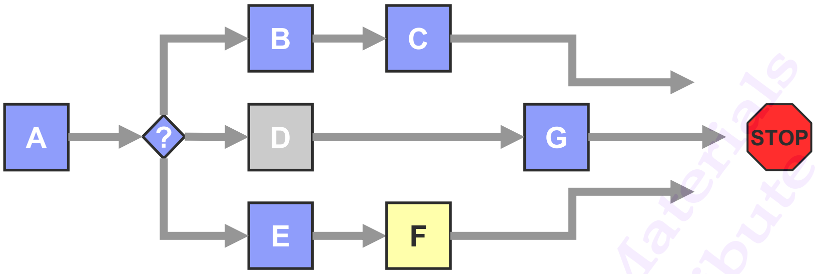


Figure 7-14. Expansion versus decomposition: High level VB1861.0

Notes:

Expanded

- Expansion: Enforces collaboration by providing impact visibility, but diagram becomes complex

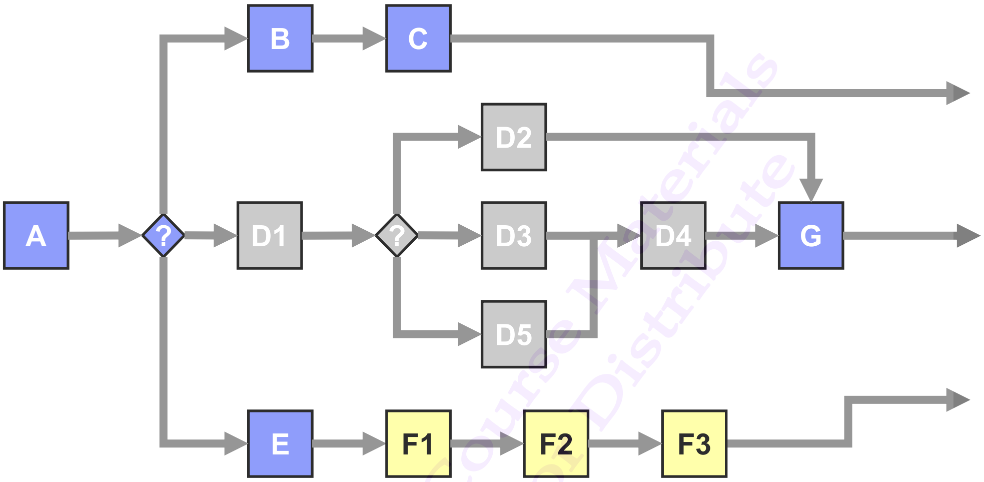


Figure 7-15. Expanded VB1861.0

Notes:

Decomposed (1 of 2)

- Decomposition: Establishes boundaries, thereby enforcing silos, but may lead to oversimplification

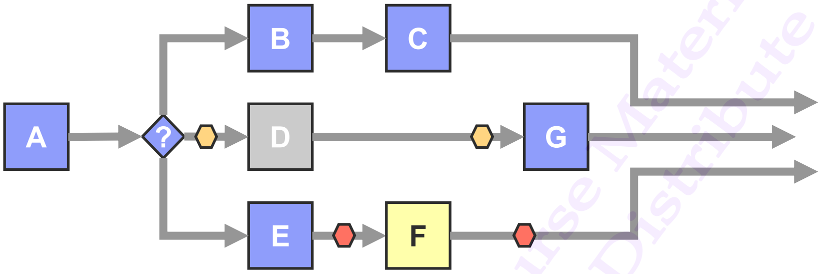


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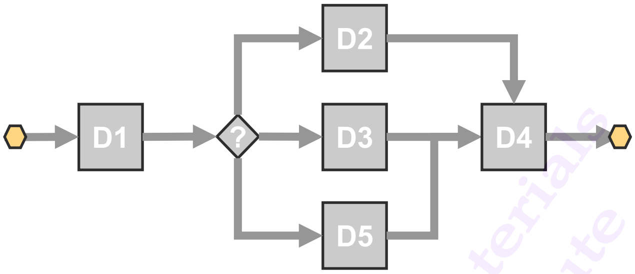
Figure 7-16. Decomposed (1 of 2) VB1861.0

Notes:

Decomposed (2 of 2)

- Expansion of D as a separate subprocess
  - Note that this information may be lost in decomposition, although it was visible in expansion.



- Expansion of F as a separate subprocess.
  - Note that F is a stand-alone process and matches the boundaries.

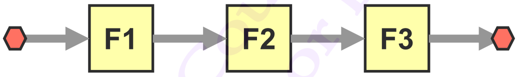


Figure 7-17. Decomposed (2 of 2) VB1861.0

Notes:

Expanded versus decomposition: Both

- Expand where collaboration occurs and decompose where boundaries are clearly defined.

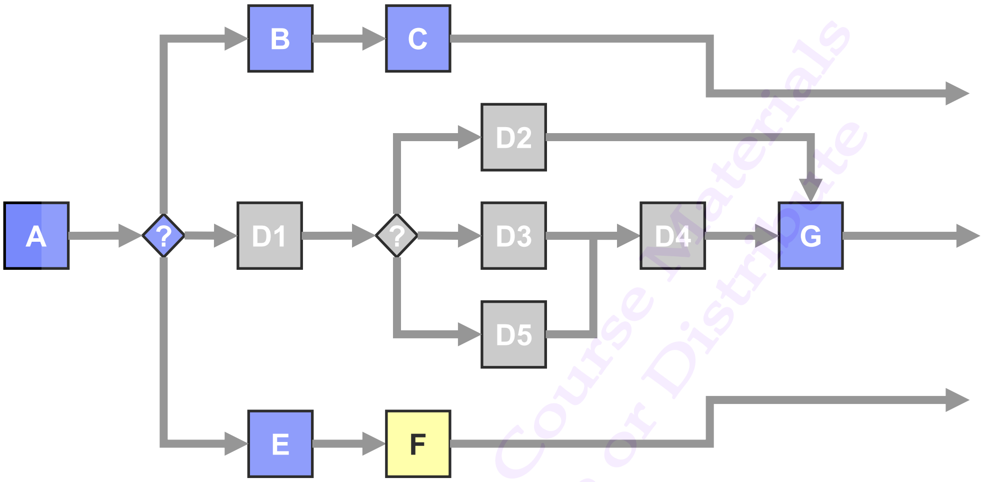
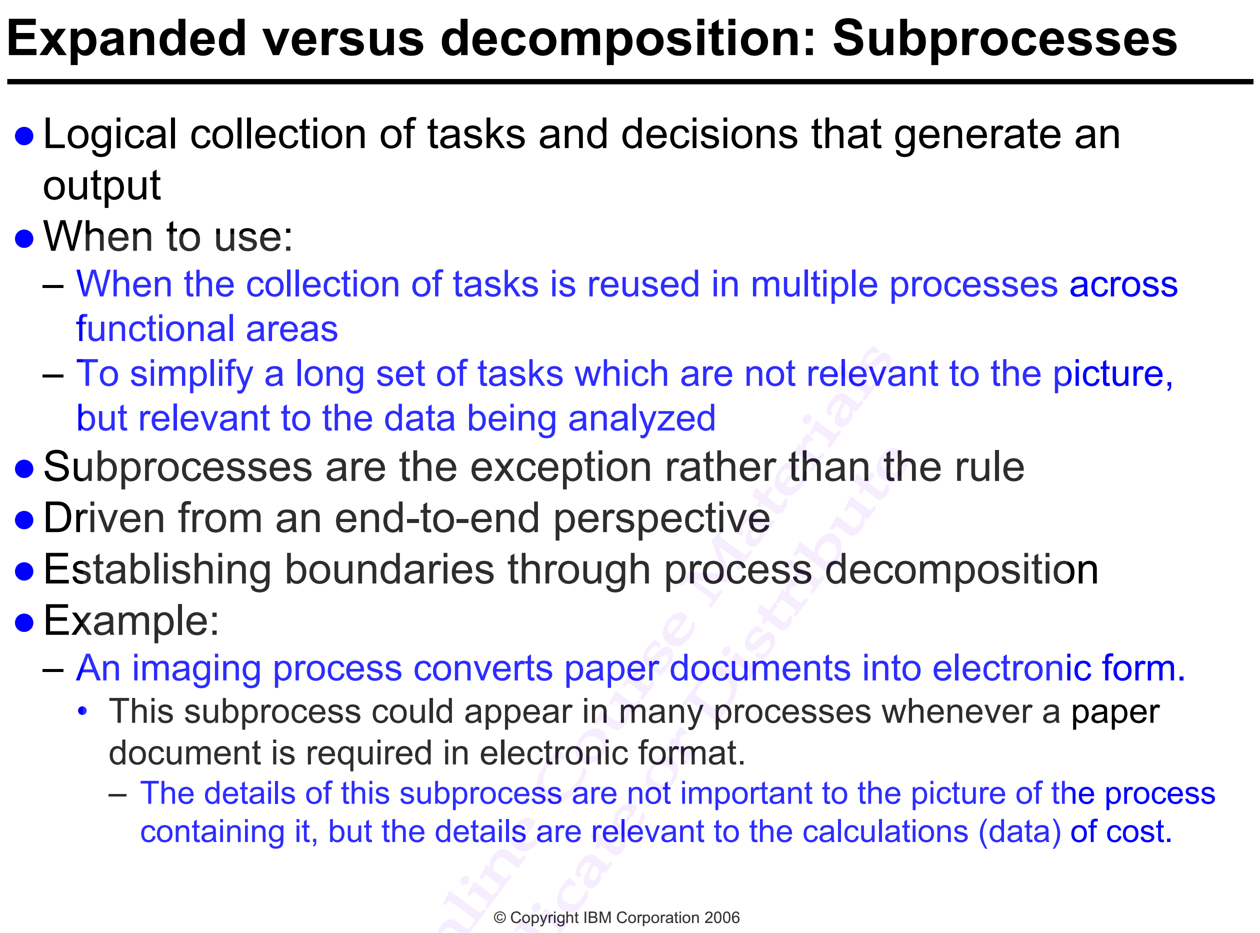


Figure 7-18. Expanded versus decomposition: Both VB1861.0

Notes:



Expanded versus decomposition: Subprocesses

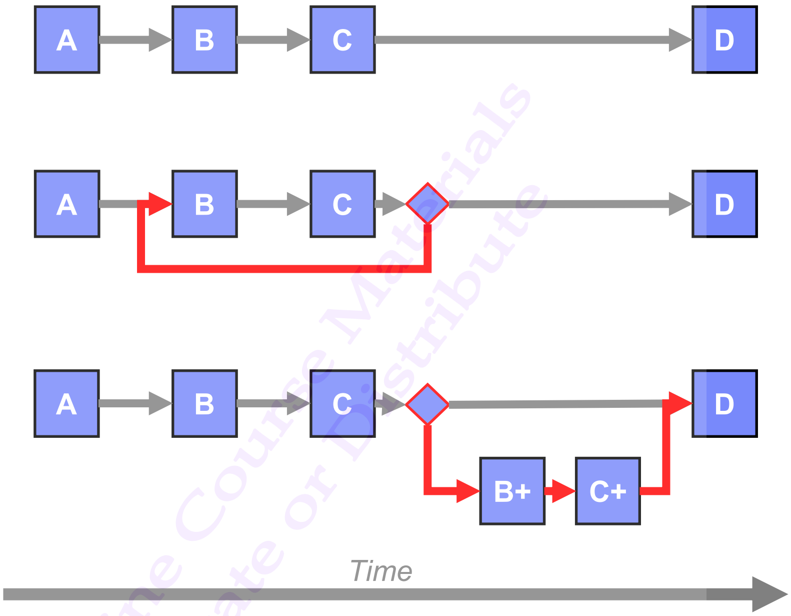
- Logical collection of tasks and decisions that generate an output
- When to use:
  - When the collection of tasks is reused in multiple processes across functional areas
  - To simplify a long set of tasks which are not relevant to the picture, but relevant to the data being analyzed
- Subprocesses are the exception rather than the rule
- Driven from an end-to-end perspective
- Establishing boundaries through process decomposition
- Example:
  - An imaging process converts paper documents into electronic form.
    - This subprocess could appear in many processes whenever a paper document is required in electronic format.
      - The details of this subprocess are not important to the picture of the process containing it, but the details are relevant to the calculations (data) of cost.

Figure 7-19. Expanded versus decomposition: Subprocesses VB1861.0

Notes:

Modeling for rework and process volume

- Modeling to show activities
  - Different ways of drawing the flow means different things



Tasks
As they occur in a perfect process

Tasks — Resource perspective
Showing rework as a function of resources — described as a role or resources loop
Resources often rework activities B and C

Tasks — Sequence perspective
Showing rework as a function of the sequence of steps over time — described as additional tasks
Resources often rework activities B and C drawn to illustrate — **cannot go back in time**

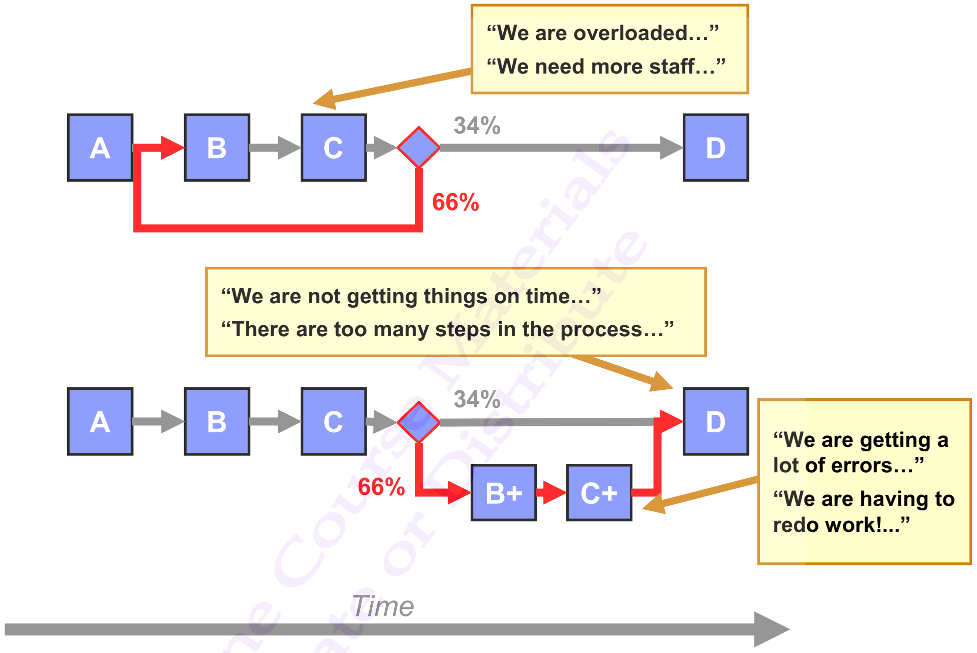
Figure 7-20. Modeling for rework and process volume VB1861.0

Notes:

Here you have a straight sequence of tasks. However, from time to time the tasks are done incorrectly and you say "go back to step B and do it again". In fact, what is happening is the work is being returned to the resource, but not to the task. The task has changed (B+) because the work may be described as "correct" form (rather than "complete" form) — two entirely different things. Therefore, to correctly model the process as it occurs from the perspective of the work product, you would see the bottom sequence.

Rework and process volume: Pain points

- Pain points recorded from subject matter experts, as a result of process volume



Resource perspective
Modeled where the jobs are not returned to the same individual — **in a rework loop**

"We are overloaded…"
"We need more staff…"

Sequence perspective

"We are not getting things on time…"
"There are too many steps in the process…"

"We are getting a lot of errors…"
"We are having to redo work!..."

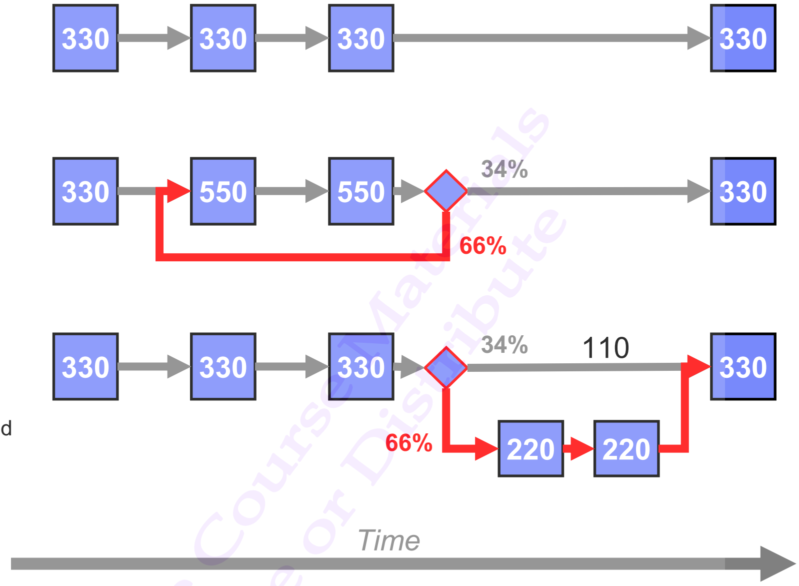
Figure 7-21. Rework and process volume: Pain points VB1861.0

Notes:

In the pain points on the top scenario, the resources performing tasks B and C are overloaded. They are performing the work once; then 66% of the time, they are doing it again.

Rework: Volume

- Modeling to show the volume (throughput) impact to the process



Tasks
As they occur in a perfect process

Tasks — Resource perspective
Showing rework as a function of resources — described as a role or resources loop

Tasks — Sequence perspective
Showing rework as a function of the sequence of steps **over time** — described as additional tasks

Figure 7-22. Rework: Volume VB1861.0

Notes:

Here you see manifesting as 550 tokens in volume for the two tasks, but this work is hidden to the eye. It can only be visually shown in the button sequence (where the repeated steps are broken out separately).

Process goal analysis

- Process goals are derived from specific organization goals and customer requirements.
  - Organizations achieve their goals through the operations of their processes.
- Process goal analysis is used to analyze a process to determine how well it supports the organization's goals.
  - The performance of the process is analyzed and evaluated against its goals.
  - Allows the focus to be set on increasing the probabilities of process cases that support organizational goals.
    - Therefore, reducing the probabilities of cases that do not support goals

Figure 7-23. Process goal analysis

Notes:

Redesign analysis

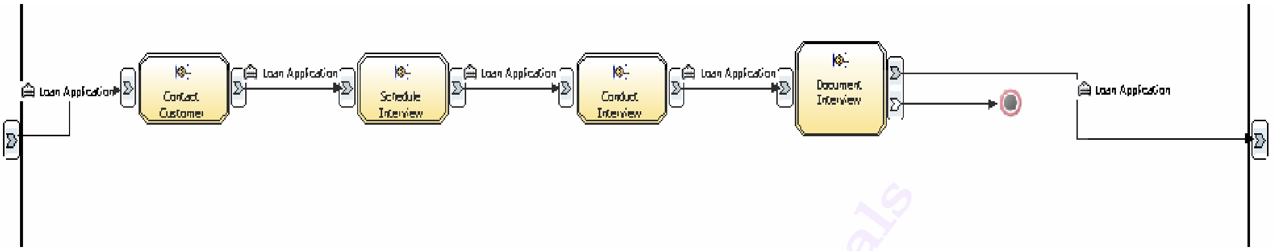
- Shows the effects of adding tasks to, or deleting tasks from, a process during the redesign phase
- Use redesign analysis when you need to:
  - Identify improvement opportunities within a process
  - Measure the effects of redesigning a process

Figure 7-24. Redesign analysis VB1861.0

Notes:

Redesign the process

- “As-is” process



- “To-be” process

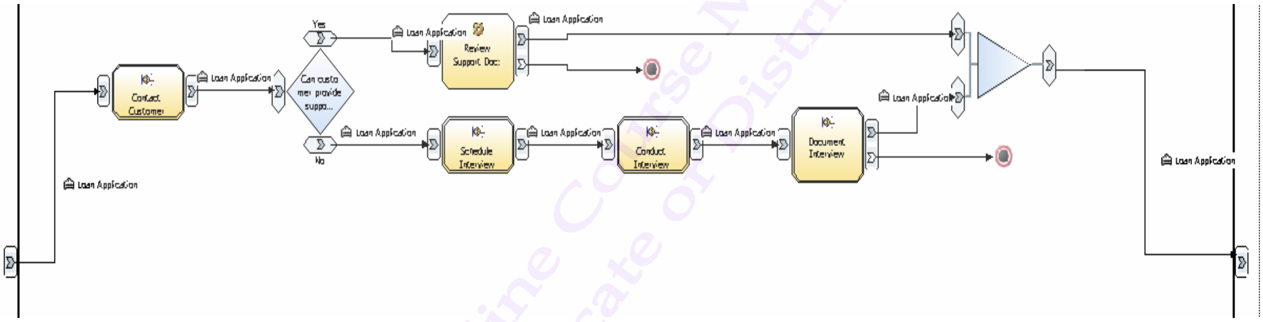
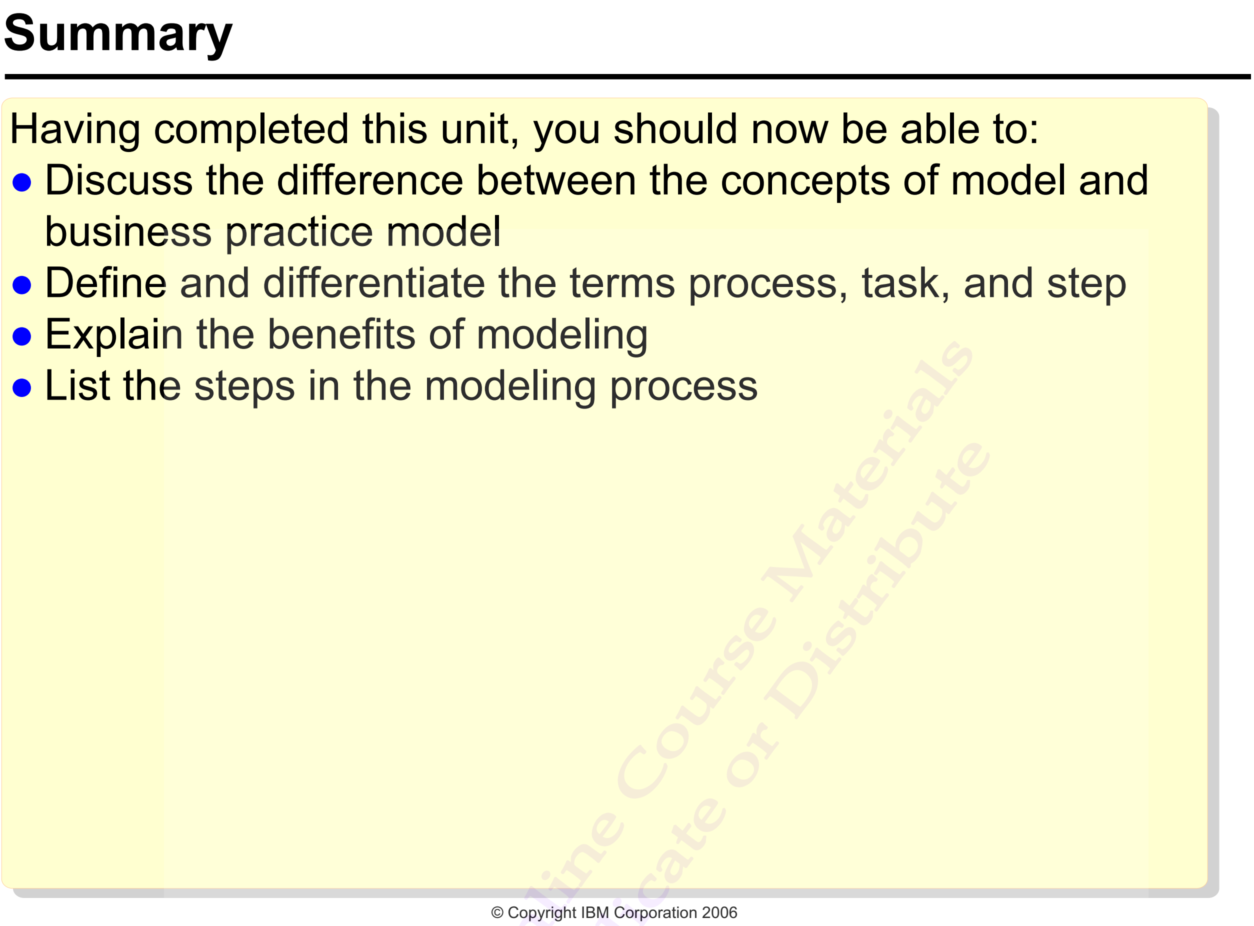


Figure 7-25. Redesign the process VB1861.0

Notes:



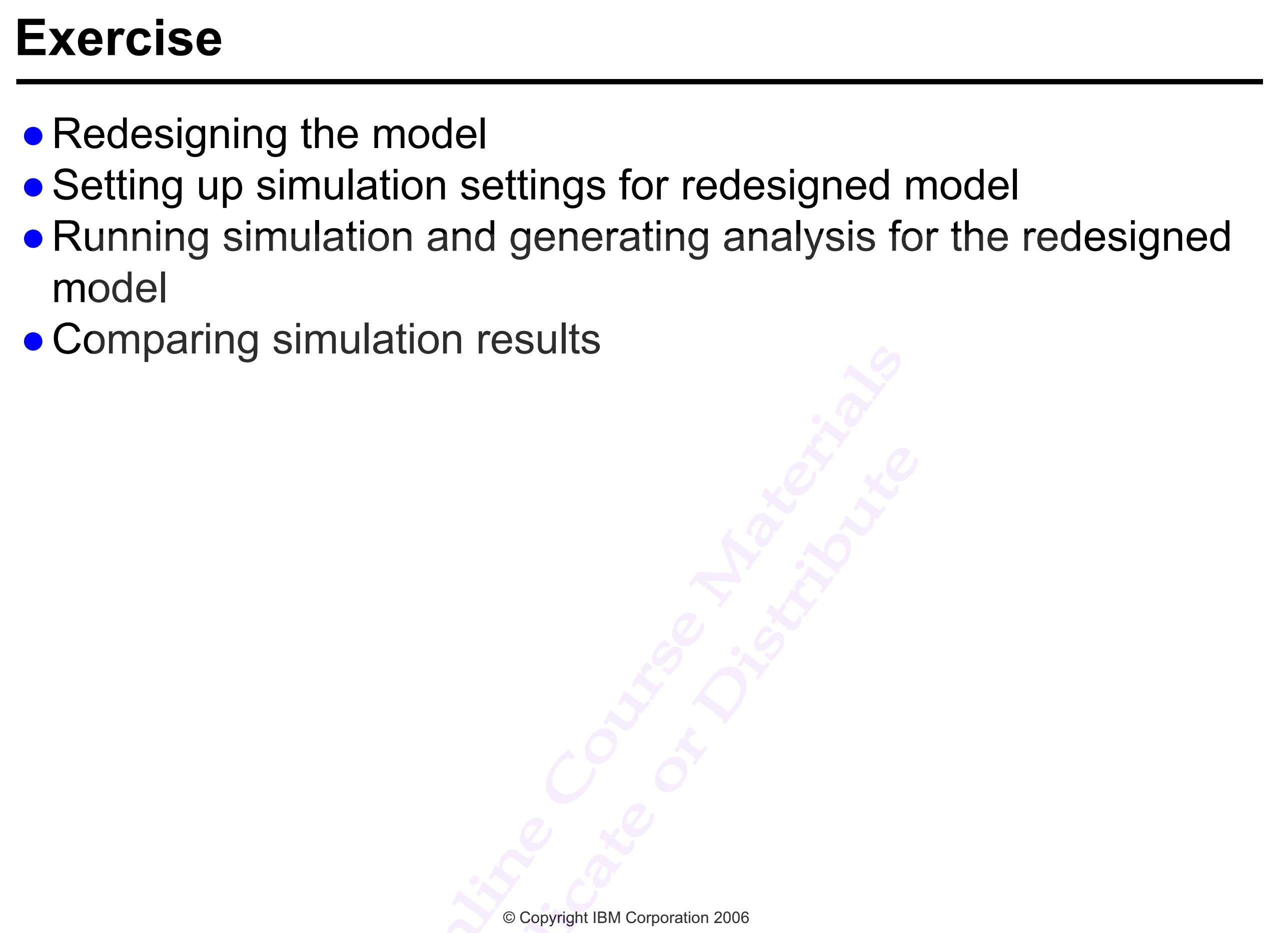
Summary

Having completed this unit, you should now be able to:

- Discuss the difference between the concepts of model and business practice model
- Define and differentiate the terms process, task, and step
- Explain the benefits of modeling
- List the steps in the modeling process

Figure 7-26. Summary VB1861.0

Notes:



Exercise

- Redesigning the model
- Setting up simulation settings for redesigned model
- Running simulation and generating analysis for the redesigned model
- Comparing simulation results

Figure 7-27. Exercise VB1861.0

Notes:

Review questions

- What types of analysis are required for process re-engineering?
- What is process goal analysis?
- When do you need to conduct redesign analysis?
- What are the four business analysis components?

Figure 7-28. Review questions VB1861.0

Notes:

The solution can be found in the appendix of the Student Exercises.

Unit 8. Custom reports and queries

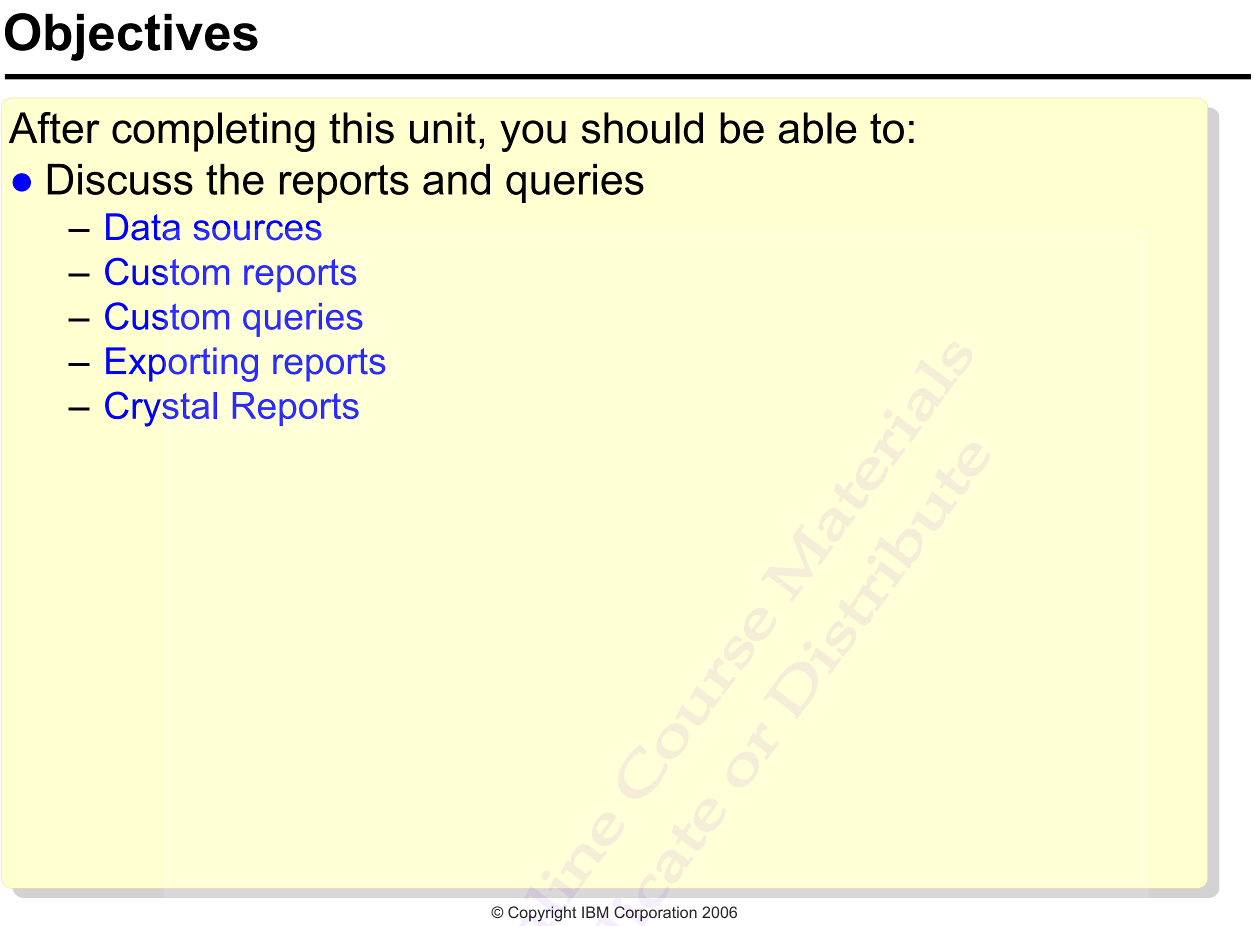
What this unit is about

This unit describes custom reports and queries.

What you should be able to do

After completing this unit, you should be able to:

- Discuss reports and queries
  - Data sources
  - Custom reports
  - Custom queries
  - Exporting reports
  - Crystal Reports



Objectives

After completing this unit, you should be able to:

- Discuss the reports and queries
  - Data sources
  - Custom reports
  - Custom queries
  - Exporting reports
  - Crystal Reports

Figure 8-1. Objectives VB1861.0

Notes:

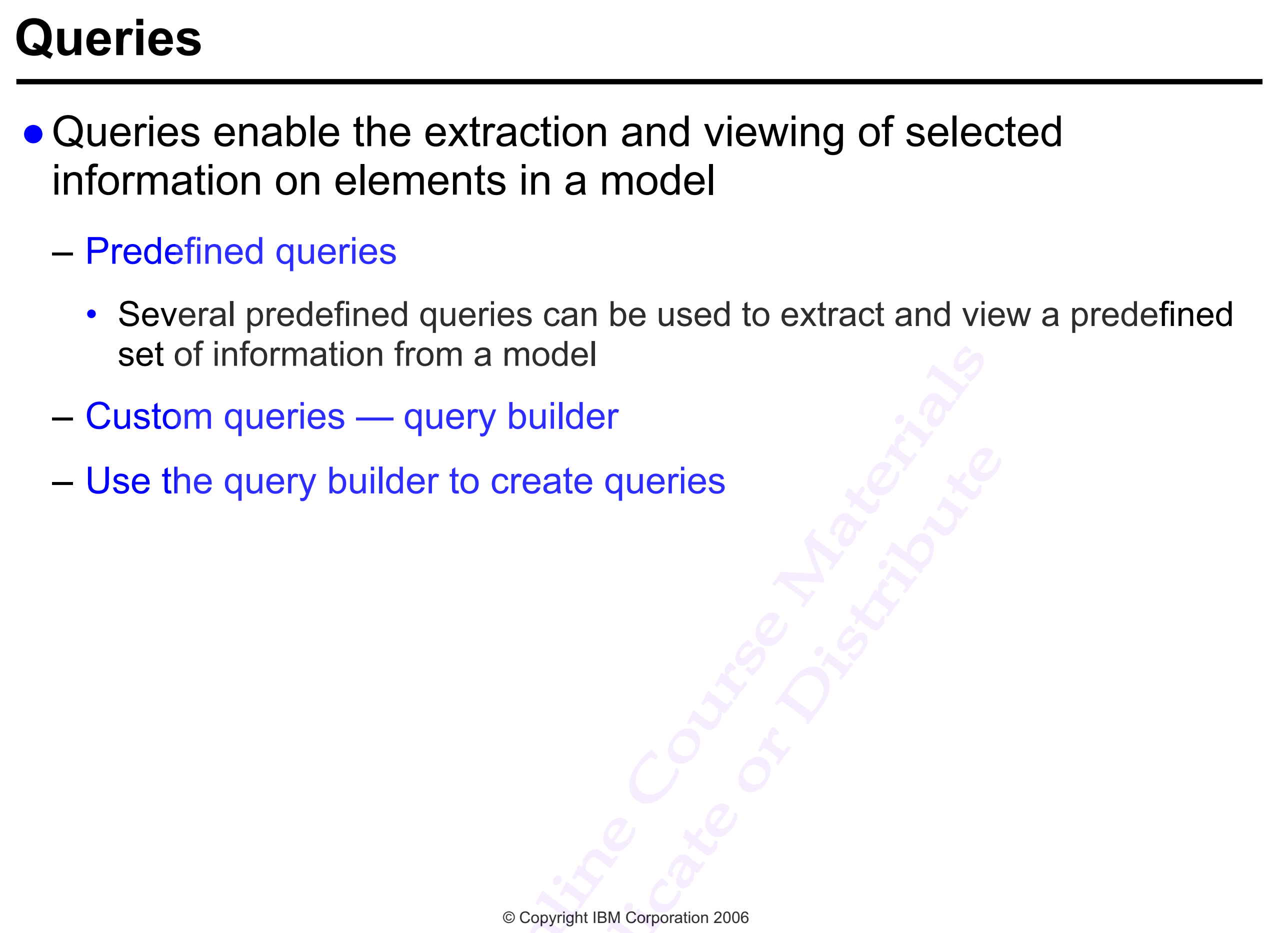
Reports

- Reports are a formatted presentation of information relating to a model or to the results of analyzing a process simulation
  - Predefined report details
    - Numerous predefined reports available in the product
  - Custom reports — report designer
    - Report catalogs
      - Organize report templates for different projects or uses
    - Report templates
      - Produce detailed reports with specific content in a specified format
    - Report style masters
      - Reuse header and footer content for multiple report templates

- Crystal Reports
  - Alternative way of creating and generating report templates

Figure 8-2. Reports VB1861.0

Notes:



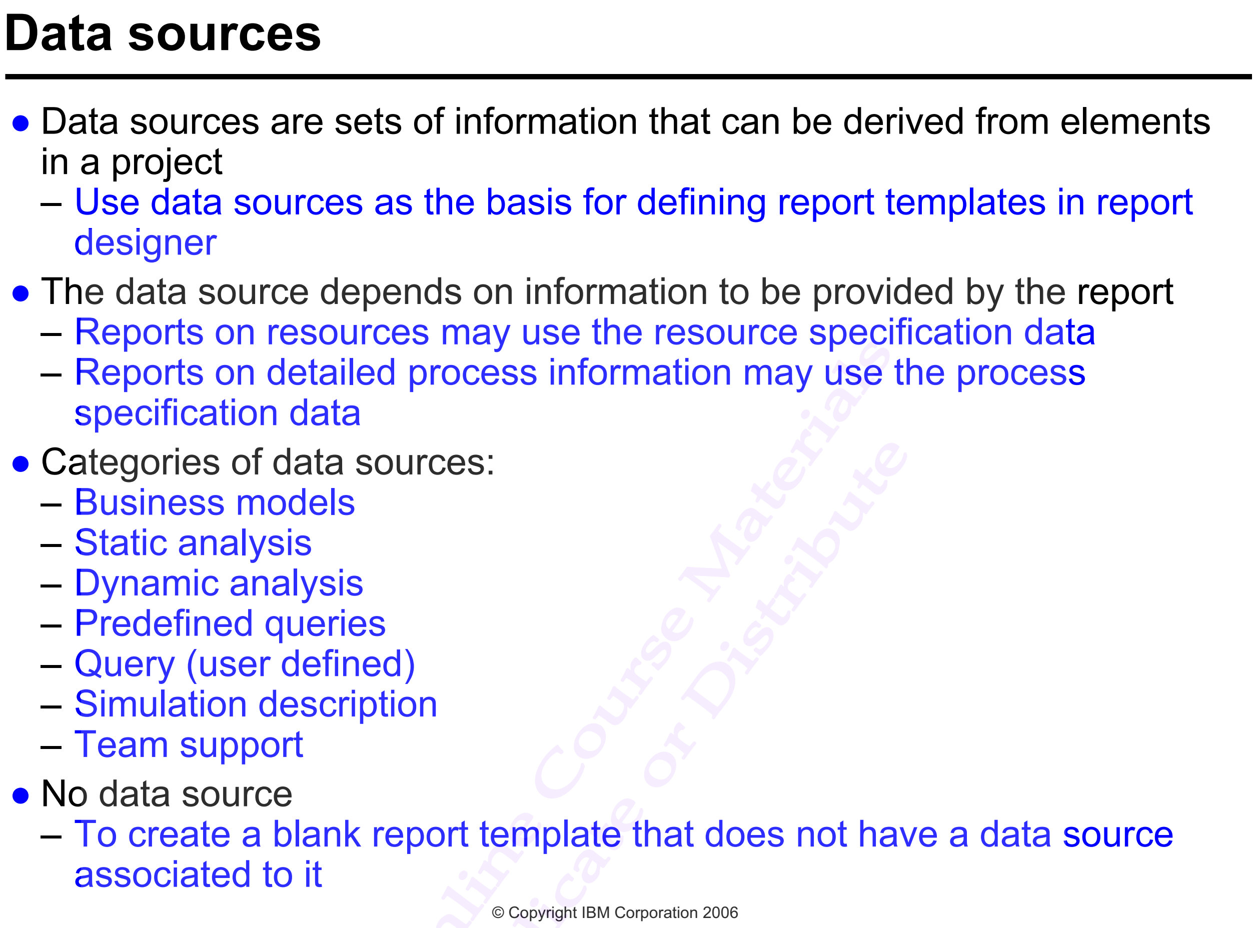
Queries

- Queries enable the extraction and viewing of selected information on elements in a model
  - Predefined queries
    - Several predefined queries can be used to extract and view a predefined set of information from a model
  - Custom queries — query builder
  - Use the query builder to create queries

Figure 8-3. Queries

VB1861.0

Notes:



Data sources

- Data sources are sets of information that can be derived from elements in a project
  - Use data sources as the basis for defining report templates in report designer
- The data source depends on information to be provided by the report
  - Reports on resources may use the resource specification data
  - Reports on detailed process information may use the process specification data
- Categories of data sources:
  - Business models
  - Static analysis
  - Dynamic analysis
  - Predefined queries
  - Query (user defined)
  - Simulation description
  - Team support
- No data source
  - To create a blank report template that does not have a data source associated to it

Figure 8-4. Data sources VB1861.0

Notes:

After creating a report template and specifying its data source, fields are added to a template by using a graphical editor to select available fields from the Fields view of the selected data source.

Categories of data sources

- Business model data sources
  - Information that is contained in a business model
- Dynamic analysis data sources
  - Information that is returned by the different types of dynamic analysis
- Predefined queries data sources
  - Information contained within predefined queries included in the product
- Query data sources
  - Information from custom queries
- Simulation description data sources
  - Information contained in simulation profiles
- Static analysis data sources
  - Information that is returned by the different types of static analysis
- Team support data sources
  - Information contained by a repository location

Figure 8-5. Categories of data sources VB1861.0

Notes:

Business model data sources

- Business item instance specification
- Business item specification
- Business item template specification
- Business item utilization
- Classifier
- Information catalog
- Location definition specification
- Location definition template specification
- Location specification
- Notification specification
- Organization catalog
- Organization definition specification
- Organization definition template specification
- Organization specification
- Process catalog
- Process level details
- Process role details
- Process specification
- Repository specification
- Resource catalog
- Resource definition specification
- Resource definition template specification
- Resource specification
- Role specification
- Service details
- Service specification
- Task specification
- Timetable specification

Figure 8-6. Business model data sources VB1861.0

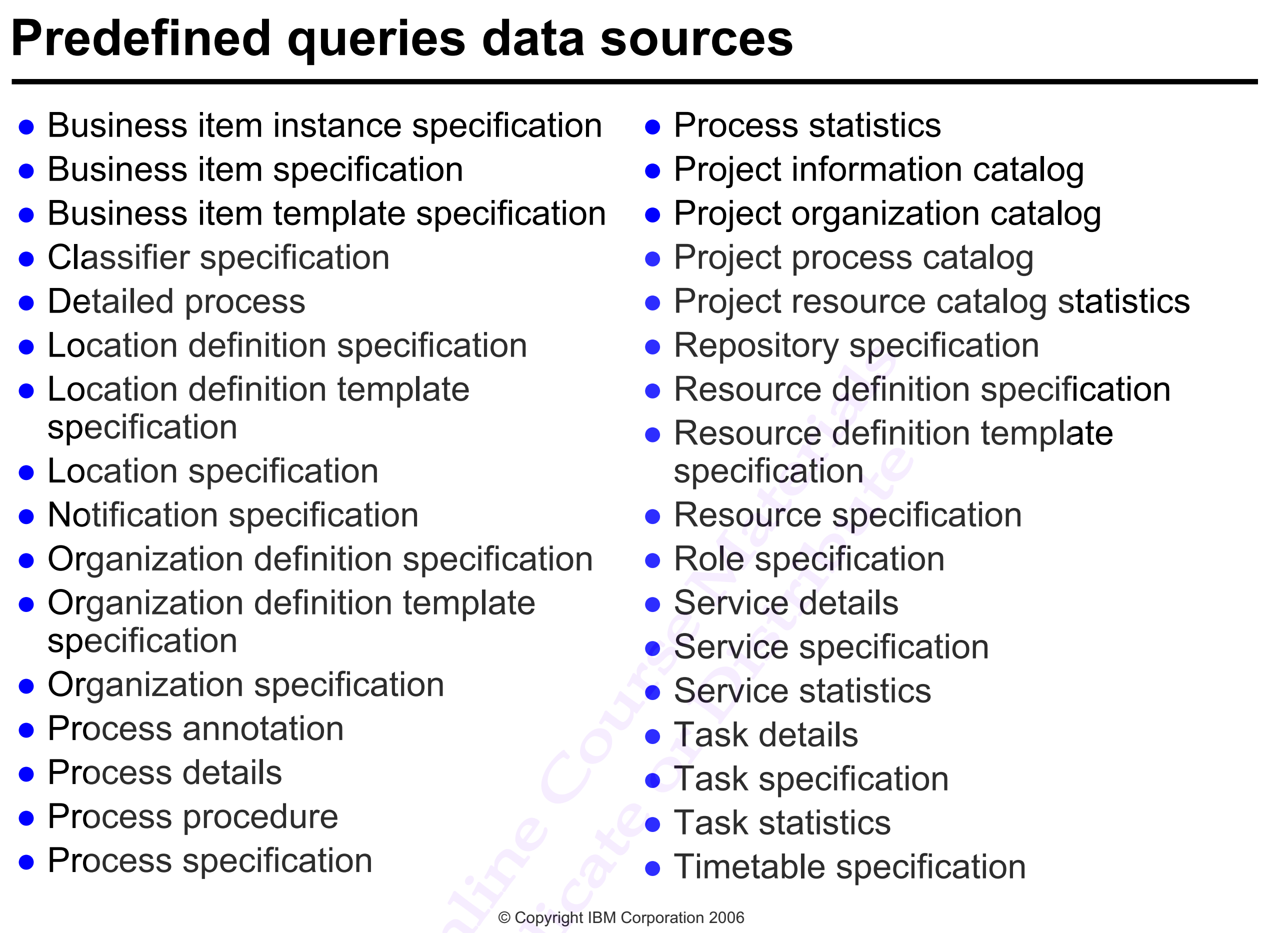
Notes:

Dynamic analysis data sources

- Activity cost
- Activity cost per time unit
- Activity duration
- Activity resource allocation
- Activity statistics
- Classifier cost and duration
- Process activities total time
- Process break even
- Process cases summary
- Process cost
- Processes break even comparison
- Processes classifier cost and duration
- Processes classifier cost comparison
- Processes classifier duration comparison
- Processes cost comparison
- Process duration
- Processes NPV/IRR comparison
- Processes resources cost comparison
- Processes resources time comparison
- Processes total time comparison
- Process instance activities free float
- Process instance cost
- Process instance critical path
- Process instance resource allocation
- Process instance shortest path
- Process instances summary
- Process instance time
- Process NPV/IRR
- Process resource
- Process resource allocation
- Profile specification
- Resource usage
- Static process cases summary

Figure 8-7. Dynamic analysis data sources VB1861.0

Notes:



Predefined queries data sources

- Business item instance specification
- Business item specification
- Business item template specification
- Classifier specification
- Detailed process
- Location definition specification
- Location definition template specification
- Location specification
- Notification specification
- Organization definition specification
- Organization definition template specification
- Organization specification
- Process annotation
- Process details
- Process procedure
- Process specification
- Process statistics
- Project information catalog
- Project organization catalog
- Project process catalog
- Project resource catalog statistics
- Repository specification
- Resource definition specification
- Resource definition template specification
- Resource specification
- Role specification
- Service details
- Service specification
- Service statistics
- Task details
- Task specification
- Task statistics
- Timetable specification

Figure 8-8. Predefined queries data sources VB1861.0

Notes:

Static analysis data sources

- Activities by classifier
- Activities by location
- Activities by organization unit
- Activities unable to start
- Activity cost and duration
- Activity resource and role leveling
- Activity throughput
- Entity structure
- Input and output paths
- Path cycles
- Paths unable to be followed
- Qualified resource availability
- Qualified resource availability for duration
- Qualified resource cost
- Qualified resources costs summary
- Qualified resources for role
- Resource availability
- Resource availability for duration
- Resource cost
- Resource roles
- Resources costs summary
- Role availability
- Role availability for duration
- Role cost
- Roles costs summary
- Type instance matching
- Type structure

Figure 8-9. Static analysis data sources VB1861.0

Notes:

Simulation and team support data sources

- Simulation description data sources
  - Simulation profile
- Team support data sources
  - History report

Figure 8-10. Simulation and team support data sources VB1861.0

Notes:

Creating report catalogs

- Report catalogs help organize report templates
  - Created in the project tree using a wizard

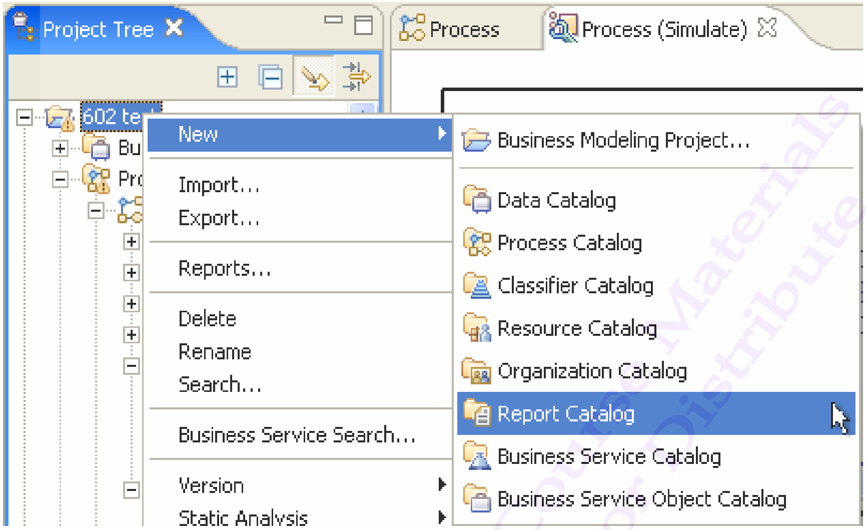
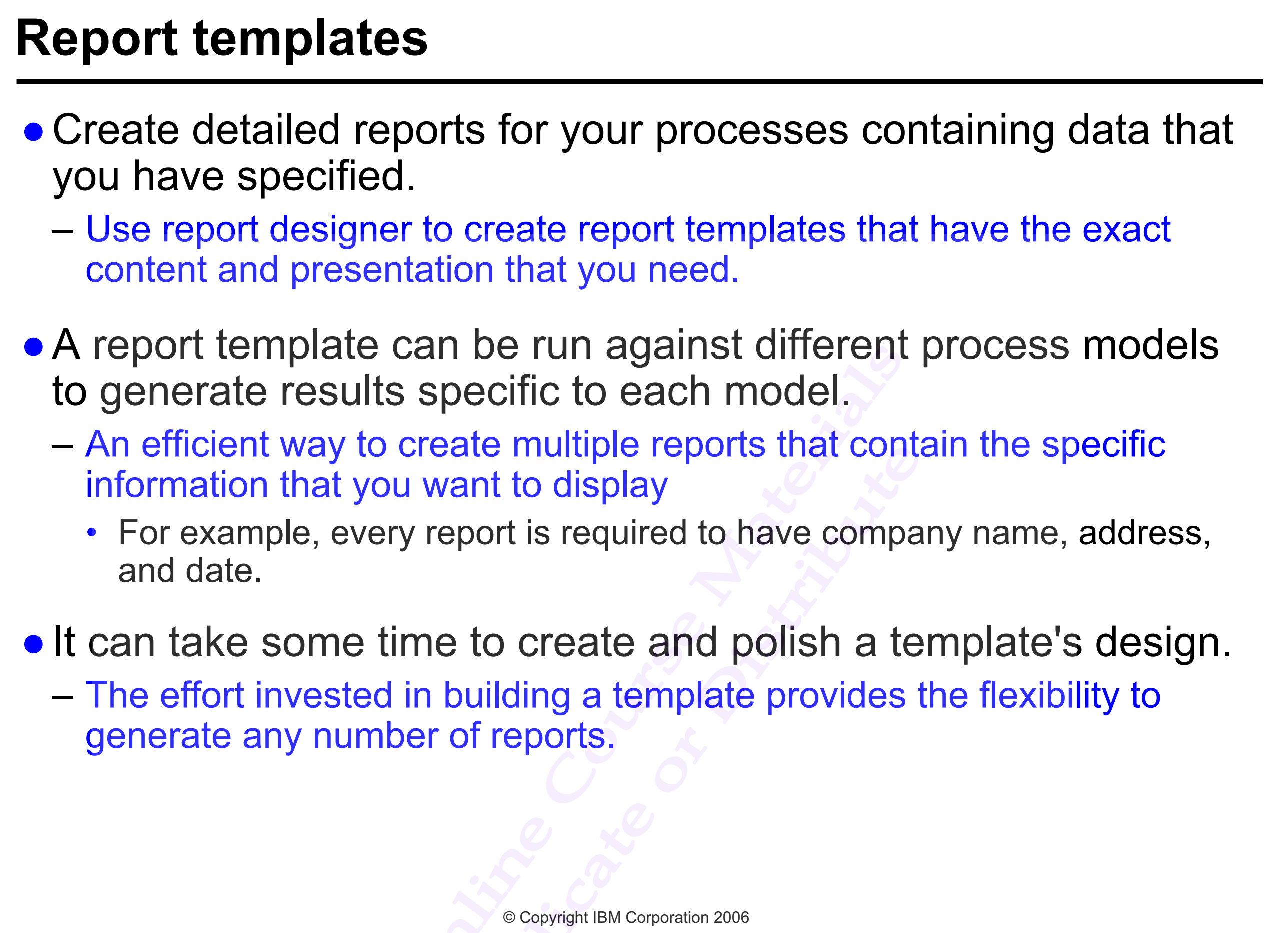


Figure 8-11. Creating report catalogs VB1861.0

Notes:

The fully qualified name of any element (which includes the workspace location and the catalog structure as well as the element name) must not exceed 256 characters.

If you export a project that contains elements with paths approaching this limitation and you import the project into a workspace that has a longer path, any elements with a path longer than 256 characters (including the target workspace location) will not be imported.



Report templates

- Create detailed reports for your processes containing data that you have specified.
  - Use report designer to create report templates that have the exact content and presentation that you need.
- A report template can be run against different process models to generate results specific to each model.
  - An efficient way to create multiple reports that contain the specific information that you want to display
    - For example, every report is required to have company name, address, and date.
- It can take some time to create and polish a template's design.
  - The effort invested in building a template provides the flexibility to generate any number of reports.

Figure 8-12. Report templates VB1861.0

Notes:

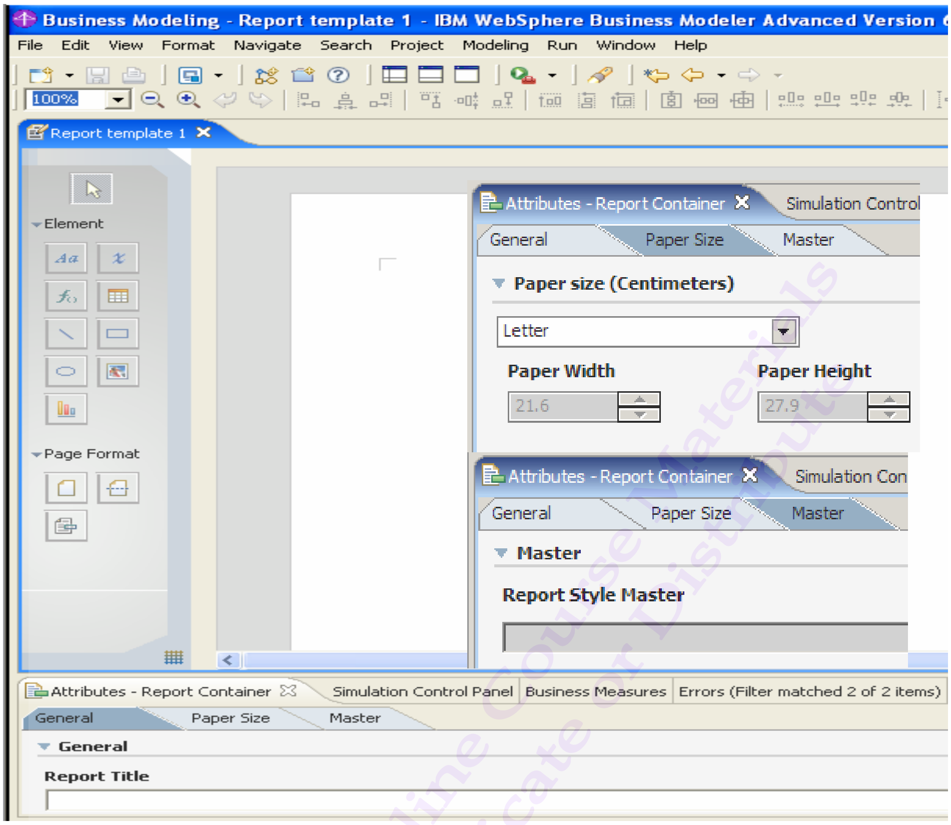
Report designer (1 of 2)

- The report designer, like the process editor and the structure editor, is a graphical editor with a palette that contains elements that can be added to the report template
  - Pages and page breaks
  - Page headers and footers
  - Tables
  - Shapes, including lines, rectangles, circles, and ellipses
  - Static text fields
  - Pictures
  - Charts
  - Table of contents
  - Summary statistics fields (such as counts, sums, and averages for selected data fields)
  - Report special fields (such as page numbers, print date, and record number)
  - Groups (a set of reporting elements such as labels and data fields that can be repeated multiple times in a generated report)
- Report designer provides many options for you to customize the appearance of elements that you add to the report template.
  - When an element is selected, the Attributes view can be used to edit the properties.

Figure 8-13. Report designer (1 of 2) VB1861.0

Notes:

Report designer (2 of 2)


Business Modeling - Report template 1 - IBM WebSphere Business Modeler Advanced Version
File Edit View Format Navigate Search Project Modeling Run Window Help
100%
Report template 1
Element
Page Format
Attributes - Report Container
Simulation Control
General
Paper Size
Master
Attributes - Report Container
Simulation Con
General
Paper Size
Master
Attributes - Report Container
Simulation Control Panel
Business Measures
Errors (Filter matched 2 of 2 items)
General
Paper Size
Master

Paper size (Centimeters)

Letter

Paper Width: 21.6

Paper Height: 27.9

Master

Report Style Master

General

Report Title

© Copyright IBM Corporation 2006

Figure 8-14. Report designer (2 of 2) VB1861.0

Notes:

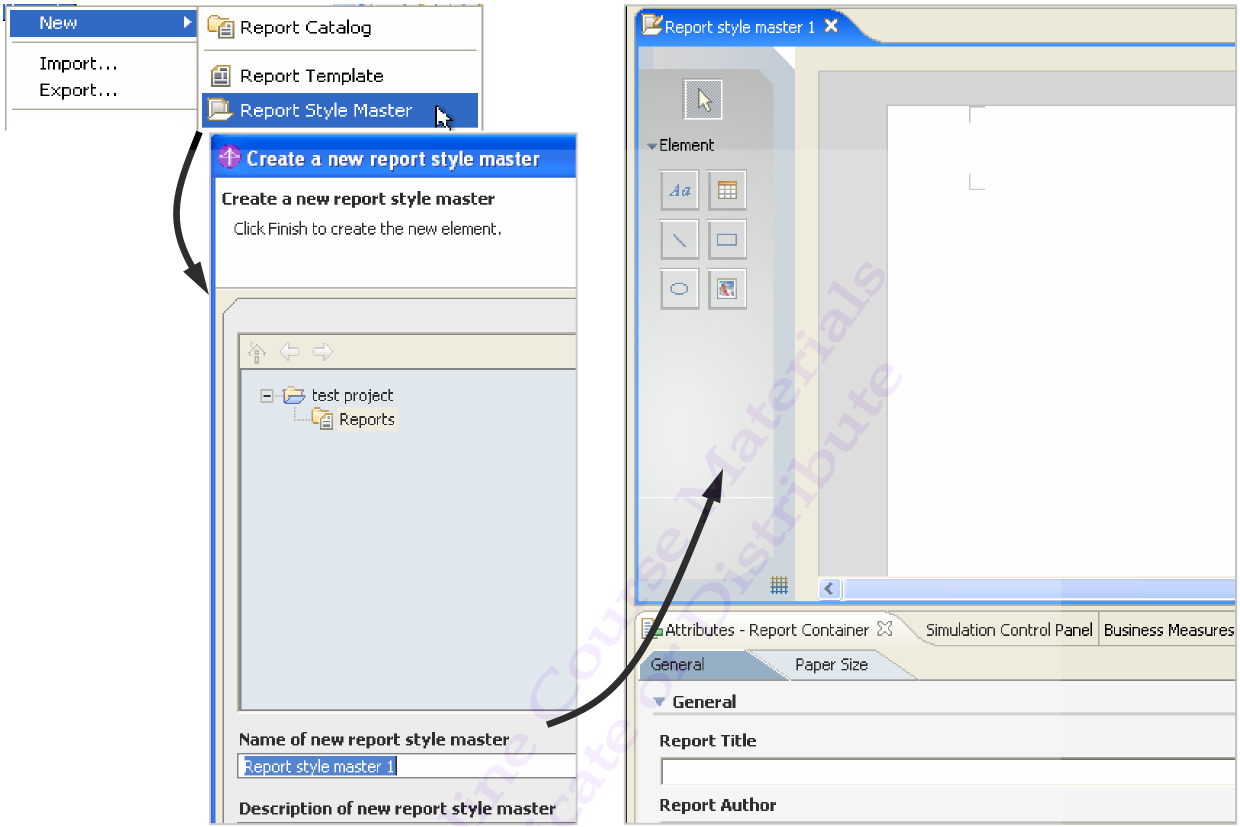
Report style master (1 of 2)

- Report style master enables you to reuse header and footer information for multiple report templates.
- Add your required fields once to a single report style master.
  - Apply that report style master to as many report templates as needed.
  - Every report template will have the same set of header and footer information.
    - For example, if you want your company name, company logo, and page numbers to appear in all your report templates, you could add those fields to an All Reports style master and then apply that style master to all of your report templates.
- Report style masters can be applied to predefined or user-defined report templates.

Figure 8-15. Report style master VB1861.0

Notes:

Report style master (2 of 2)



Create a new report style master

Create a new report style master

Click Finish to create the new element.

Name of new report style master

Report style master 1

Description of new report style master

General

Report Title

Report Author

Figure 8-16. Report designer VB1861.0

Notes:

Setting report designer preferences

- Setting report preferences
  - Set various preferences to control the default format of elements in the report designer.

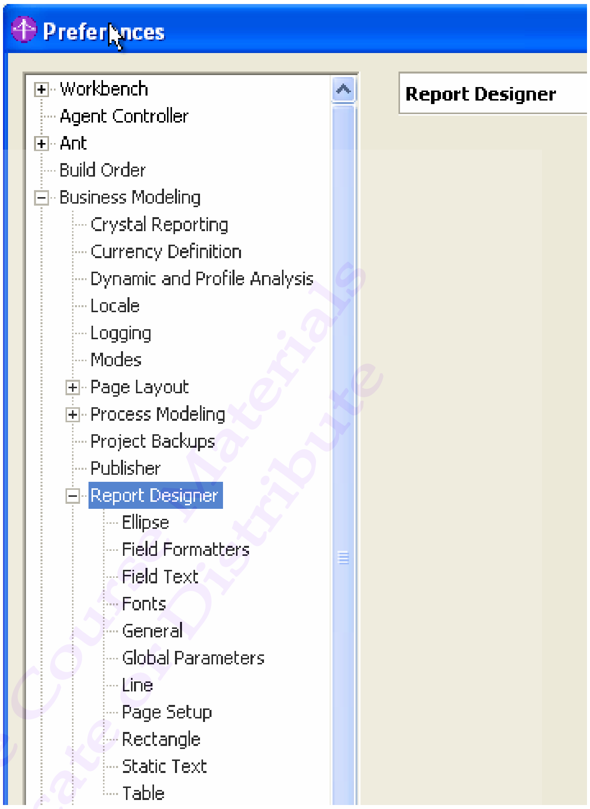


Figure 8-17. Setting report designer preferences VB1861.0

Notes:

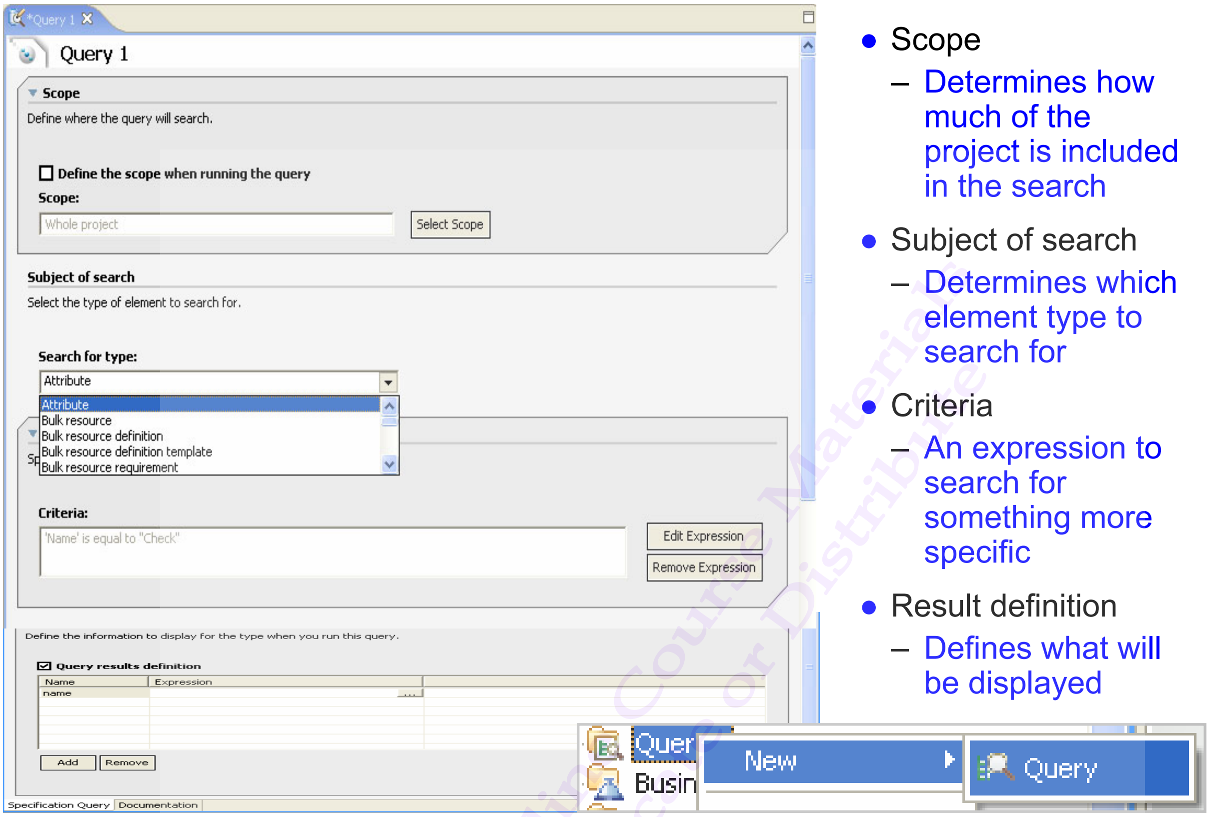
Queries

- Queries extract and show information on elements of a model.
  - Queries return information about model elements of one specified type
- Use queries to:
  - Confirm that the content of your models accurately represents your business
  - Gather required information for making business decisions
  - Document and disseminate specific types of information
  - Define the content used for creating reports
- Query builder is used to create queries.
  - Expressions can be used to get information on specific model elements.
    - For example, create a query that retrieves all the individual resources that have a cost per time unit of $20.00 or less.

Figure 8-18. Queries VB1861.0

Notes:

Creating queries



Query 1

Scope

Define where the query will search.

☐ Define the scope when running the query

Scope: Whole project

Subject of search

Select the type of element to search for.

Search for type: Attribute

Criteria: 'Name' is equal to "Check"

Define the information to display for the type when you run this query.

☑ Query results definition

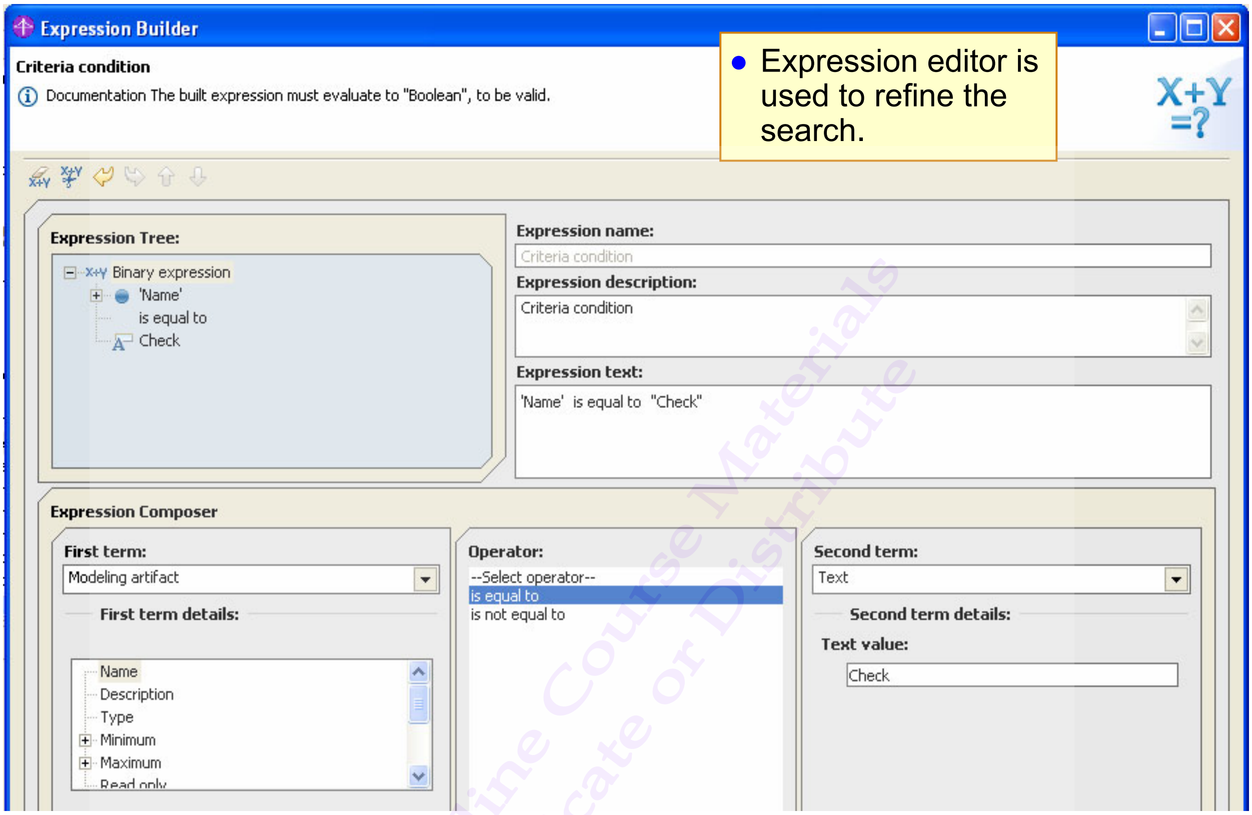
Name	Expression
name	

- Scope
  - Determines how much of the project is included in the search
- Subject of search
  - Determines which element type to search for
- Criteria
  - An expression to search for something more specific
- Result definition
  - Defines what will be displayed

Figure 8-19. Creating queries VB1861.0

Notes:

Search for type



- Expression editor is used to refine the search.

Criteria condition

Documentation The built expression must evaluate to "Boolean", to be valid.

Expression Tree:

- Binary expression
  - 'Name'
  - is equal to
  - Check

Expression name: Criteria condition

Expression description: Criteria condition

Expression text: 'Name' is equal to "Check"

Expression Composer

First term: Modeling artifact

First term details:

- Name
- Description
- Type
- Minimum
- Maximum
- Read only

Operator:

- --Select operator--
- is equal to
- is not equal to

Second term: Text

Second term details:

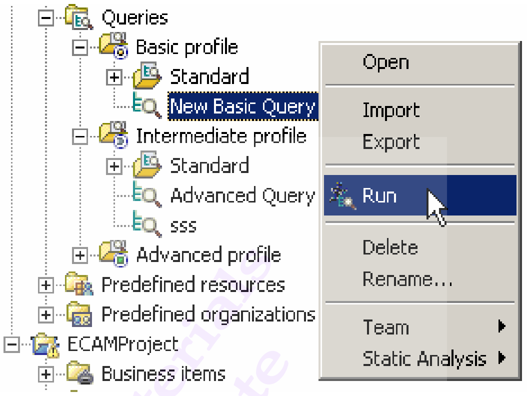
Text value: Check

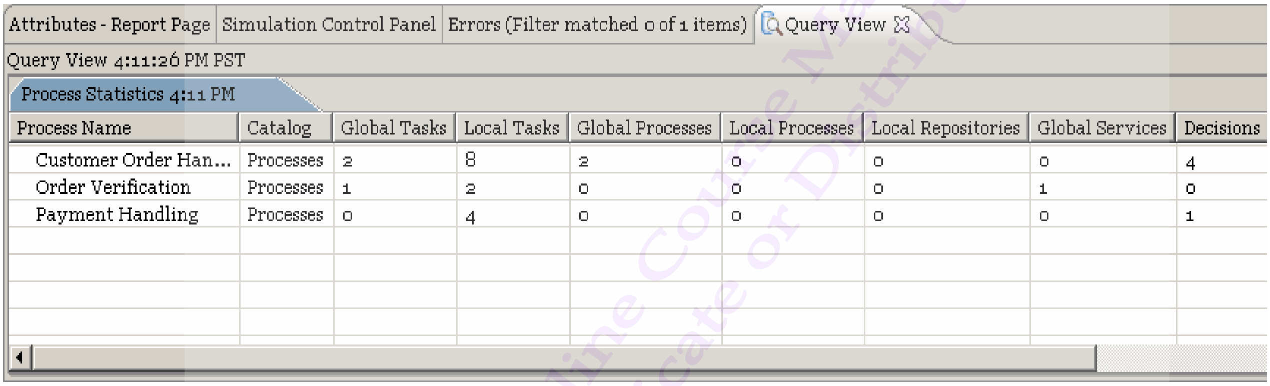
Figure 8-20. Search for type VB1861.0

Notes:

Running the query

- Run from the project tree
- If the query scope is defined at execution time
  - The query will display the scope dialog to select a scope once it executes
- The query view displays the query results





Query View 4:11:26 PM PST

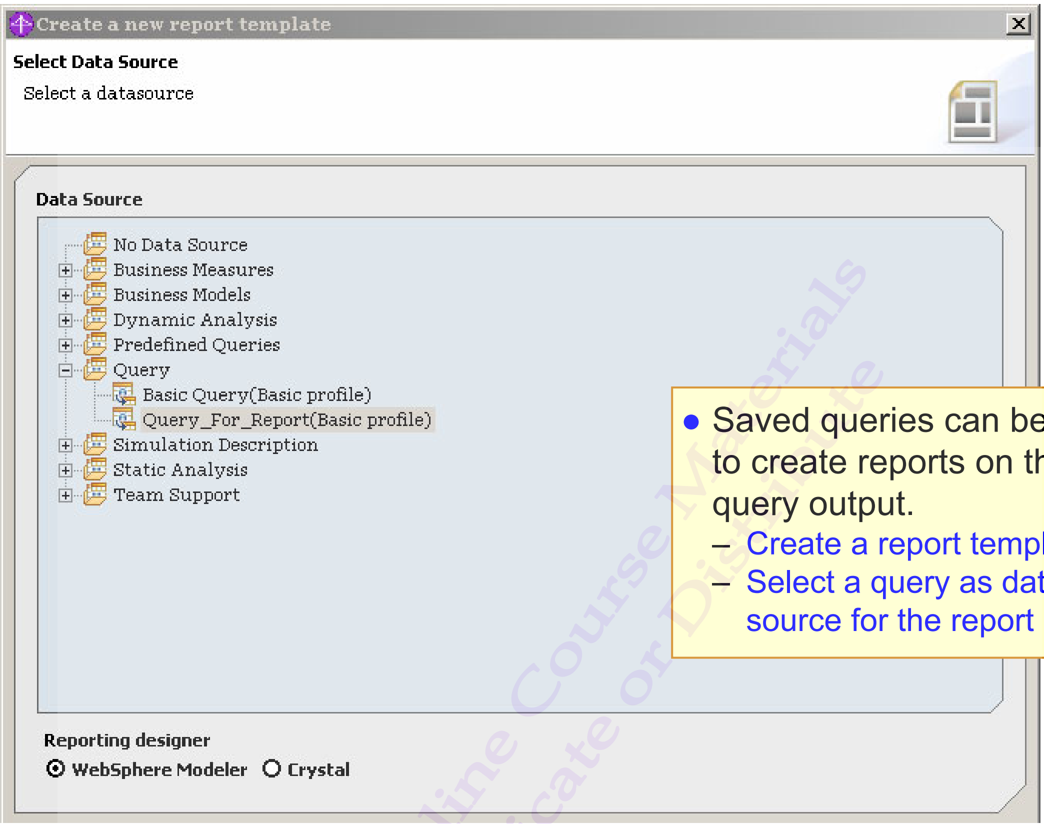
Process Statistics 4:11 PM

Process Name	Catalog	Global Tasks	Local Tasks	Global Processes	Local Processes	Local Repositories	Global Services	Decisions
Customer Order Han...	Processes	2	8	2	0	0	0	4
Order Verification	Processes	1	2	0	0	0	1	0
Payment Handling	Processes	0	4	0	0	0	0	1

Figure 8-21. Running the query VB1861.0

Notes:

Using queries in reporting



Create a new report template

Select Data Source

Select a datasource

Data Source

- No Data Source
- Business Measures
- Business Models
- Dynamic Analysis
- Predefined Queries
- Query
  - Basic Query(Basic profile)
  - Query_For_Report(Basic profile)
- Simulation Description
- Static Analysis
- Team Support

Reporting designer

● WebSphere Modeler ○ Crystal

- Saved queries can be used to create reports on the query output.
  - Create a report template
  - Select a query as data source for the report

Figure 8-22. Using query in reporting VB1861.0

Notes:

Exporting reports

- Exporting reports allows for the use of the information contained in your models for a variety of purposes.
  - Export documentation reports
  - Export reports that show the results of any type of analysis you run on a model or on simulation results
  - Export reports that show the version history of model elements.
  - Export custom reports based on report templates that were created in the report designer
- Changing text size in generated reports:
  - If the text in a generated report is too large or too small to be useful, it can be changed.

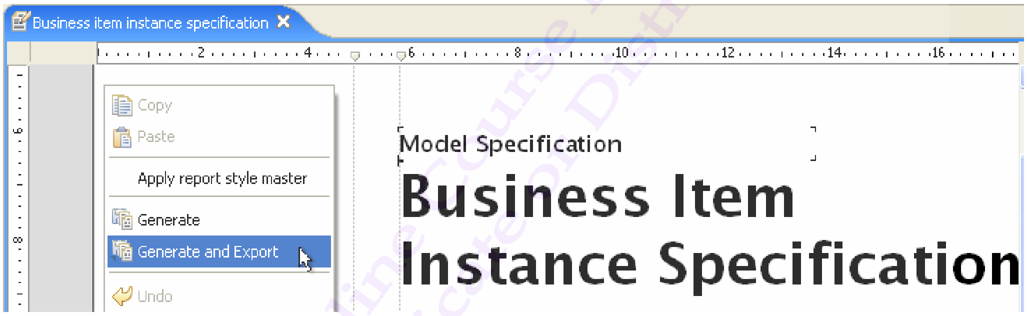
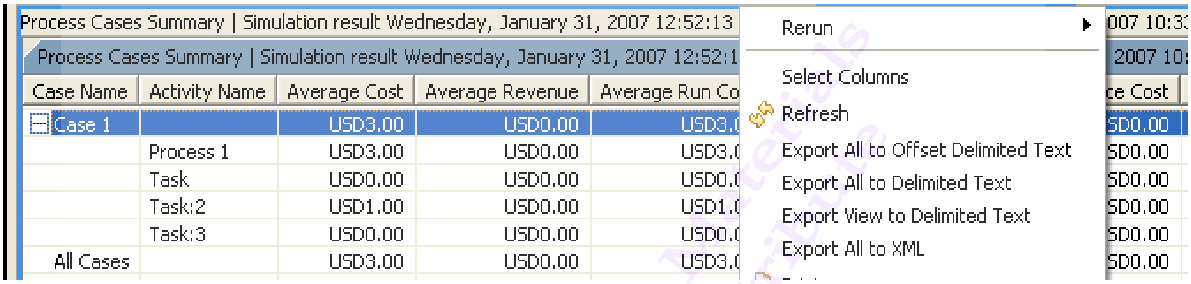


Figure 8-23. Exporting reports VB1861.0

Notes:

Exporting analysis data

- Export from the analysis view
  - Data exported depend on the type of analysis displayed


Rerun
Select Columns
Refresh
Export All to Offset Delimited Text
Export All to Delimited Text
Export View to Delimited Text
Export All to XML

Process Cases Summary | Simulation result Wednesday, January 31, 2007 12:52:13

Process Cases Summary | Simulation result Wednesday, January 31, 2007 12:52:1

Case Name	Activity Name	Average Cost	Average Revenue	Average Run Co	ce Cost
Case 1		USD3.00	USD0.00	USD3.(	SD0.00
	Process 1	USD3.00	USD0.00	USD3.(	SD0.00
	Task	USD0.00	USD0.00	USD0.(	SD0.00
	Task:2	USD1.00	USD0.00	USD1.(	SD0.00
	Task:3	USD0.00	USD0.00	USD0.(	SD0.00
All Cases		USD3.00	USD0.00	USD3.(	SD0.00

Figure 8-24. Exporting analysis data VB1861.0

Notes:

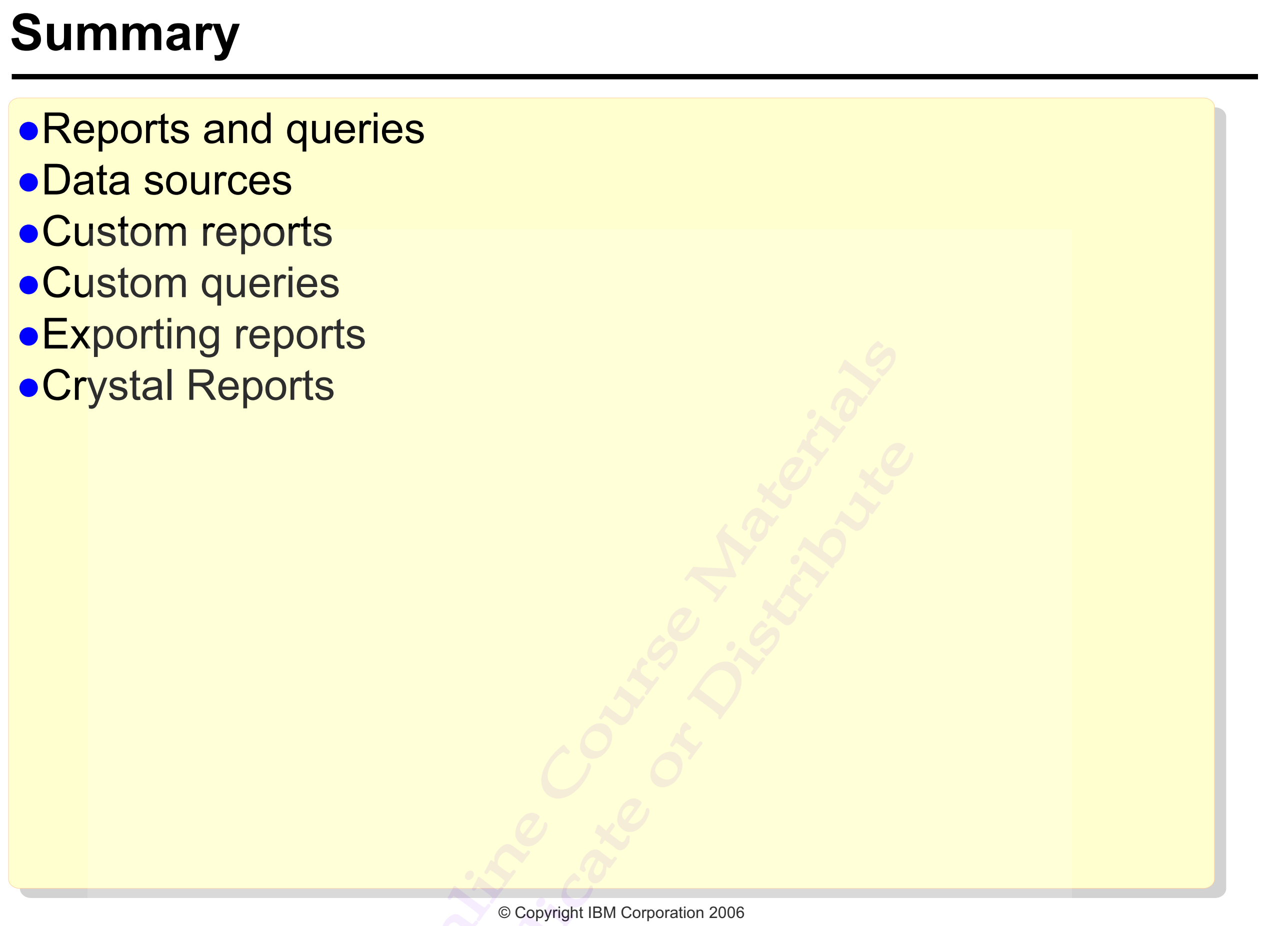
Crystal Reports

- WebSphere Business Modeler also provides support for Crystal Reports, to facilitate the work of organizations that already use this application.
  - Crystal Reports is a separate product from WebSphere Business Modeler.
- Activities related to Crystal Reports:
  - Create new report templates in the Project Tree view, define their content using WebSphere Business Modeler data sources, and start the Crystal Reports design environment to specify the particulars of the report template.
  - Copy, rename, and delete report templates.
  - Generate and export reports based on existing report templates from the Project Tree view (assuming that Crystal Reports is installed on the local machine).
  - View and print generated reports.
  - Import report templates that have been defined by another user.
  - Export report templates for use or customization by another user.
  - Check in and check out CVS versions of report templates.
- WebSphere Business Modeler does not provide any predefined Crystal Reports templates.

Figure 8-25. Crystal Reports VB1861.0

Notes:

WebSphere Business Modeler does not provide any predefined Crystal Reports templates. If you want to use the predefined report templates, you can generate and export them directly from the Project Tree view without using Crystal Reports.



Summary

- Reports and queries
- Data sources
- Custom reports
- Custom queries
- Exporting reports
- Crystal Reports

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Figure 8-26. Summary VB1861.0

Notes:

Exercise

- Creating a report style master
- Creating a report template
- Adding report details
- Adding report chart
- Applying a report style master to report

Figure 8-27. Exercise VB1861.0

Notes:

Review questions

- Name some of the categories of data sources used in the Modeler reports
- What data source would contain information by a repository location of version control system?
- What is the function of report style master?
- What is the scope used for when creating a query?

Figure 8-28. Review questions VB1861.0

Notes:

The solution can be found in the appendix of the Student Exercises.

Unit 9. Web publishing for administration

What this unit is about

This unit describes the Web publishing for administration.

What you should be able to do

After completing this unit, you should be able to:

- Explain the architecture overview of WebSphere Business Modeler Publishing Server
- Describe the function of administration portals
- Modify user and group assignments

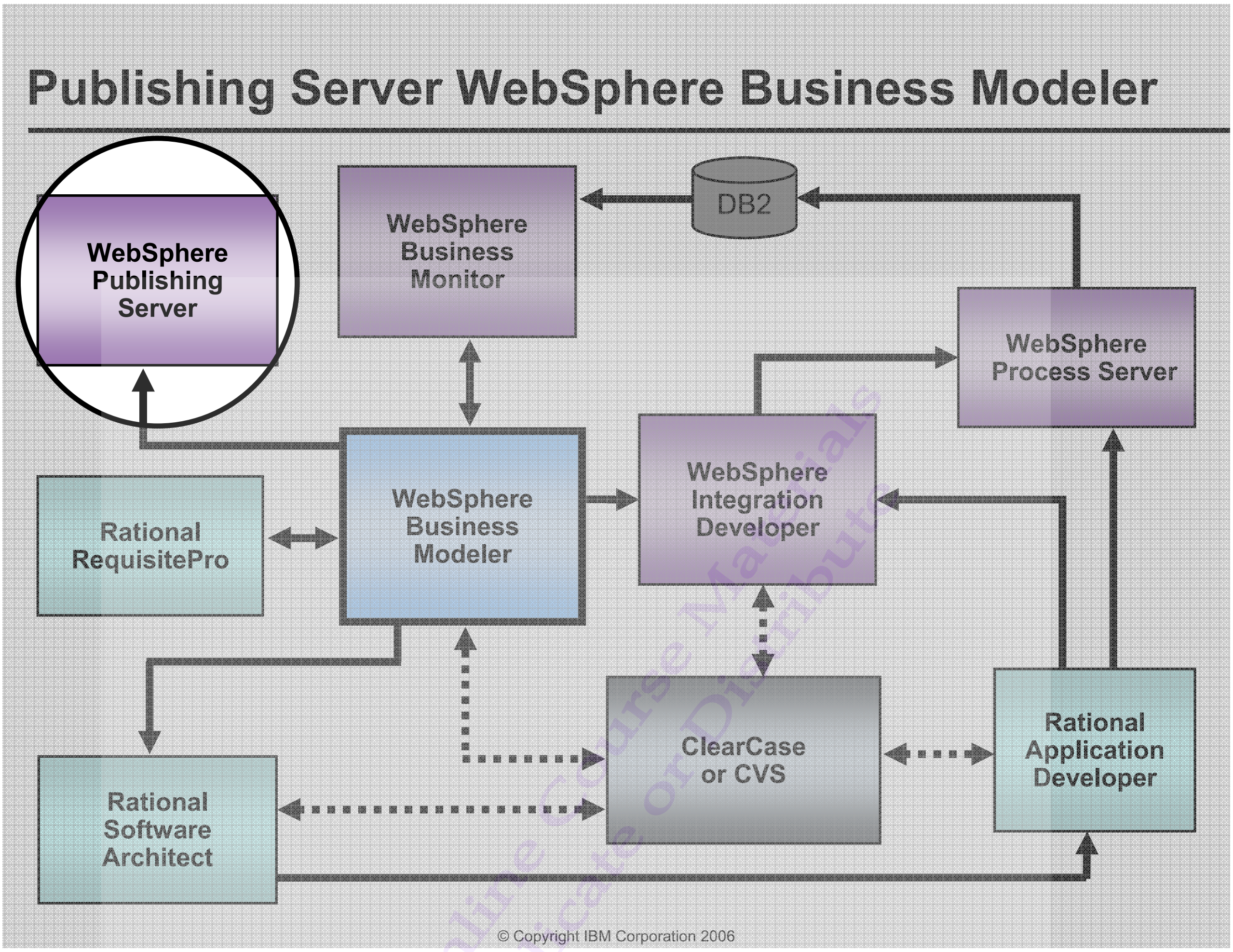
Objectives

After completing this unit, you should be able to:

- Explain the architecture overview of WebSphere Business Modeler Publishing Server
- Discuss the function of administration portals
- Modifying user and group assignments

Figure 9-1. Objectives VB1861.0

Notes:



Publishing Server WebSphere Business Modeler

WebSphere Publishing Server
WebSphere Business Monitor
DB2
WebSphere Process Server
Rational RequisitePro
WebSphere Business Modeler
WebSphere Integration Developer
ClearCase or CVS
Rational Application Developer
Rational Software Architect

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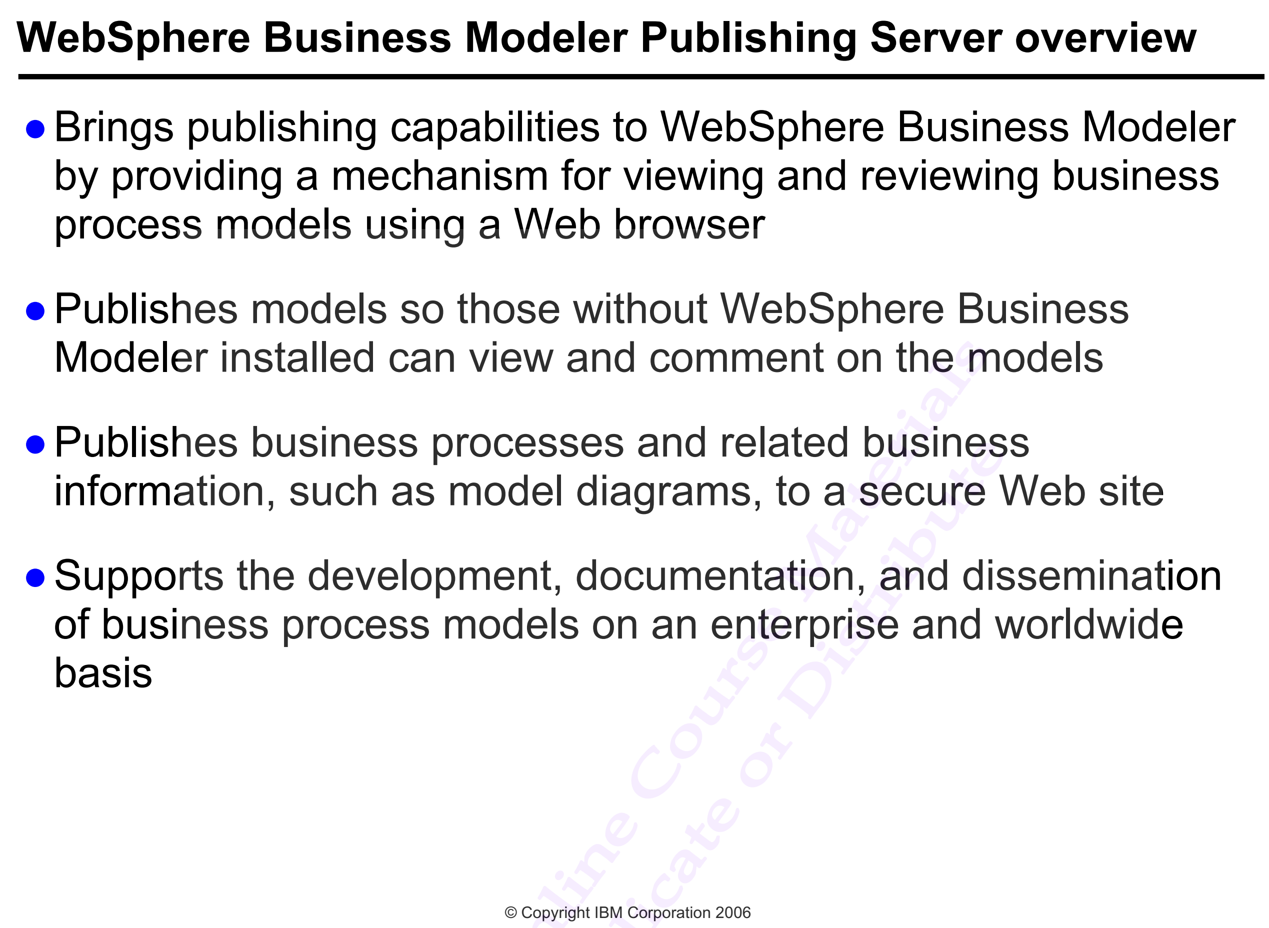
Figure 9-2. Publishing Server in WebSphere Business Modeler VB1861.0

Notes:

Legend:

- - - - - - Version control flow (dashed line)

——— Development flow (solid line)



WebSphere Business Modeler Publishing Server overview

- Brings publishing capabilities to WebSphere Business Modeler by providing a mechanism for viewing and reviewing business process models using a Web browser
- Publishes models so those without WebSphere Business Modeler installed can view and comment on the models
- Publishes business processes and related business information, such as model diagrams, to a secure Web site
- Supports the development, documentation, and dissemination of business process models on an enterprise and worldwide basis

Figure 9-3. WebSphere Business Modeler Publishing Server overview VB1861.0

Notes:

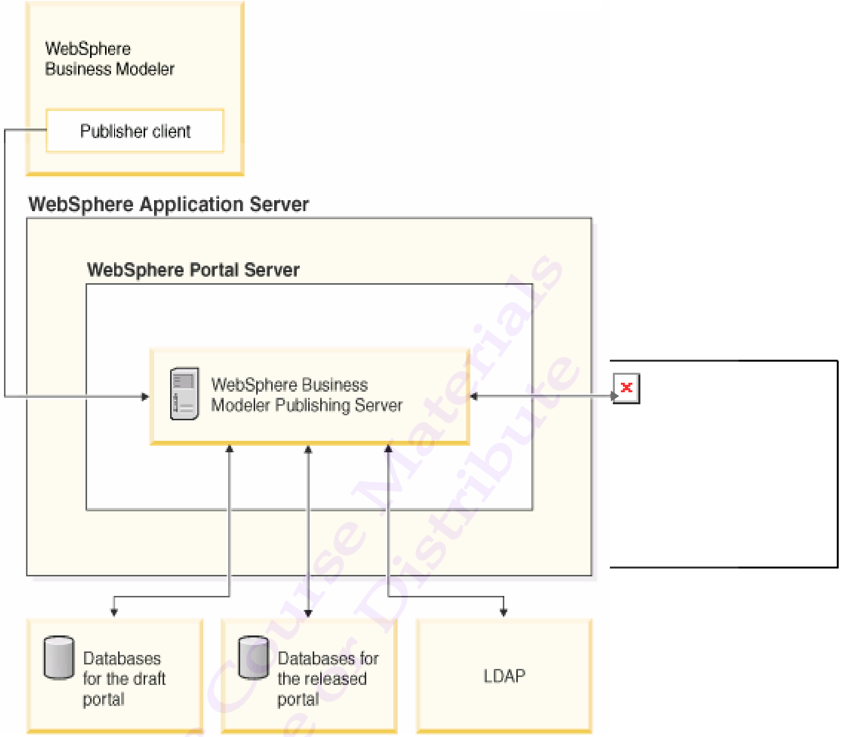
Provide a way of gathering information and validating the business process models and then distributing for reviews.

- Accurate process models
  - A tool to view visual representations of business processes and supporting information.
  - The more accurate and detailed the modeled business processes are, the more accurate the results of the analysis performed on the model.
  - A more accurate model can forecast the effects of changing the business processes.
- Viewable business processes
  - Publishing Server can publish the business process model to make it more widely available within an organization.

- Any authorized person in the organization can then view the process using a standard Web browser.

Architecture overview

- Consists of a publisher client and a publishing server.
- Uses the browser client to interact with users.
- Publisher client is integrated within WebSphere Business Modeler.
- Provides the interface to one or more servers running Publishing Server.
- Publisher client transforms selected model elements and then sends the transformed information to the specified publishing server.
- The reviewed and finalized model will be copied to Released portal database.


WebSphere Business Modeler
Publisher client
WebSphere Application Server
WebSphere Portal Server
WebSphere Business Modeler Publishing Server
Databases for the draft portal
Databases for the released portal
LDAP

- Use SVG (Scalable Vector Graphics) browser plug-in to display process and organization diagrams.

Figure 9-4. Architecture overview VB1861.0

Notes:

In WebSphere Business Modeler, the publisher client is visible as a preference setting and as a context menu item that is displayed when a WebSphere Business Modeler user right-clicks a model element. The preference settings capture information about publishing server and identify a default server, if a default server is desired. The context menu item enables the user to identify the publishing server that will host the model element. It also lets you know whether the publishing action includes only the selected model element, or the selected element and any other model element the selected element references. Publishing with references provides a more complete model, while publishing without references provides a way of updating only specific elements on the server.

IBM WebSphere Application Server is a Web application server that provides J2EE services for the WebSphere Portal environment. WebSphere Portal Server provides the environment to support the publishing server portlets. The IBM HTTP Server handles the communication between a publishing server and a browser client.

An LDAP server such as IBM Tivoli Directory Server handles the authentication and administration of users. Once the LDAP server has authenticated a user, the publishing server consults the user database for the Draft portal or the Released portal to determine which elements will be displayed to the user (as an individual user or as a member of a group) and which element the user can comment upon. A publishing server administrator is the person that uses an administration portal to set the access rights of a user or group.

The browser client is the Microsoft Internet Explorer Web browser with an SVG (Scalable Vector Graphics) plug-in, such as the recommended Adobe SVG Viewer, which is available at no cost from the Internet. The browser client displays the model contents in a set of portlets in the Draft portal or in the Released portal.

To display process and organization diagrams, your Internet browser requires an *SVG* (Scalable Vector Graphics) browser plug-in.

There are many SVG plug-ins available for downloading on the Internet. The recommended Web browser is Microsoft Internet Explorer and the recommended SVG browser plug-in is the Adobe SVG Viewer. The following procedure describes how to set up Internet Explorer with SVG Viewer. Other Internet browsers and plug-in combinations are untested and may require different steps.

To set up your Web browser, complete the following steps:

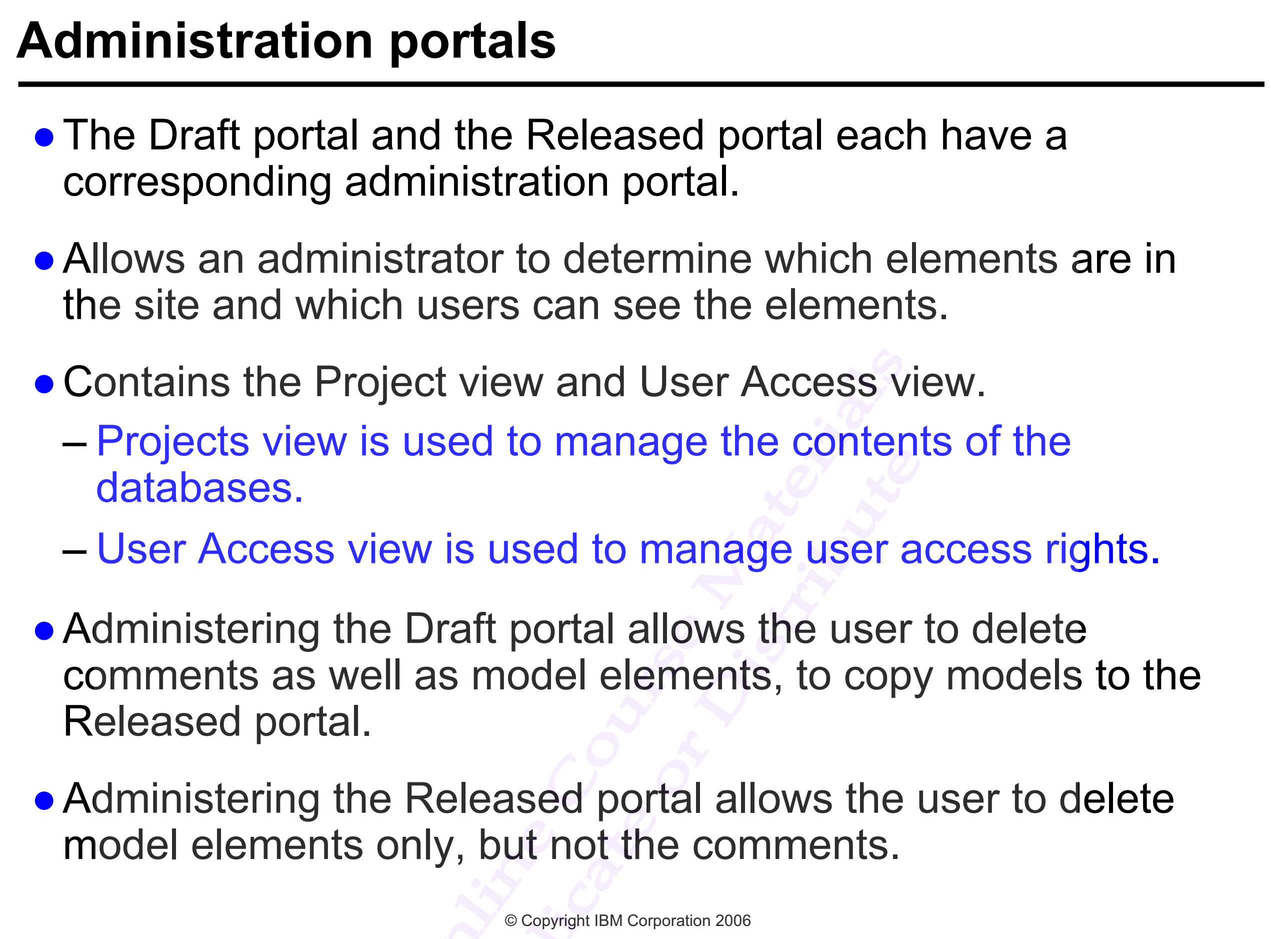
- Go to the Adobe Web site (`http://www.adobe.com`) and download the SVG Viewer file.
- Close Microsoft Internet Explorer.
- Double-click the downloaded file to install the viewer.
- Restart Microsoft Internet Explorer.

Publishing server portals

The publishing server has the following portals:
- Welcome portal
- Draft portal
- Released portal
- Administration portals

Figure 9-5. Publishing server portals VB1861.0

Notes:



Administration portals

- The Draft portal and the Released portal each have a corresponding administration portal.
- Allows an administrator to determine which elements are in the site and which users can see the elements.
- Contains the Project view and User Access view.
  - Projects view is used to manage the contents of the databases.
  - User Access view is used to manage user access rights.
- Administering the Draft portal allows the user to delete comments as well as model elements, to copy models to the Released portal.
- Administering the Released portal allows the user to delete model elements only, but not the comments.

Figure 9-6. Administration portals VB1861.0

Notes:

Projects view

- Projects view is used to manage the contents of the databases.
- This portlet contains several sections:
  - Purge database where an administrator can delete the entire contents of a portal database.
  - Copy to the Released portal section (Draft portal only) where an administrator can copy one or more projects to the Released portal.
  - Delete elements section where an administrator can delete specific model elements from a project.

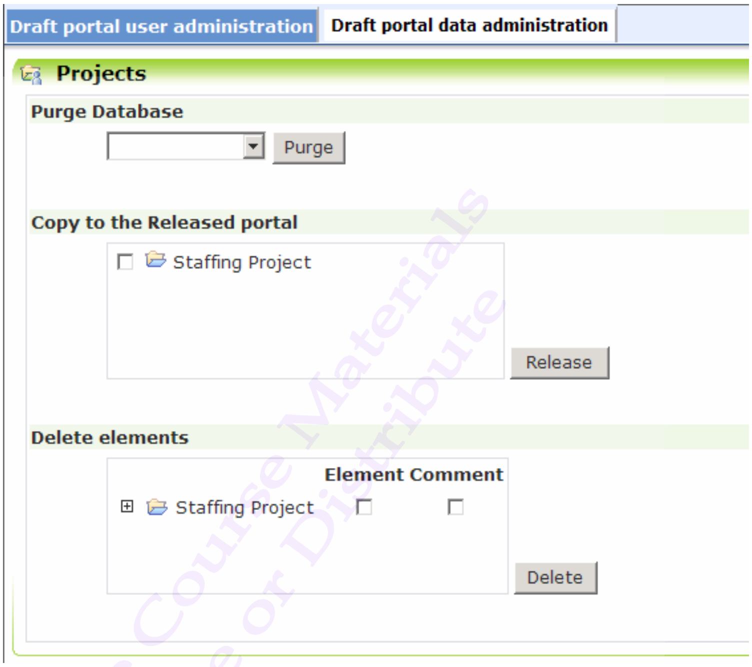


Figure 9-7. Project view VB1861.0

Notes:

User access view

- User access view:
  - User Access view is used to manage user access rights.
- User access rights:
  - View: allows users to view the content only
  - Review: allows users to view and comment the content
- The Users and Groups portlet lists the users or groups currently defined in the LDAP server.

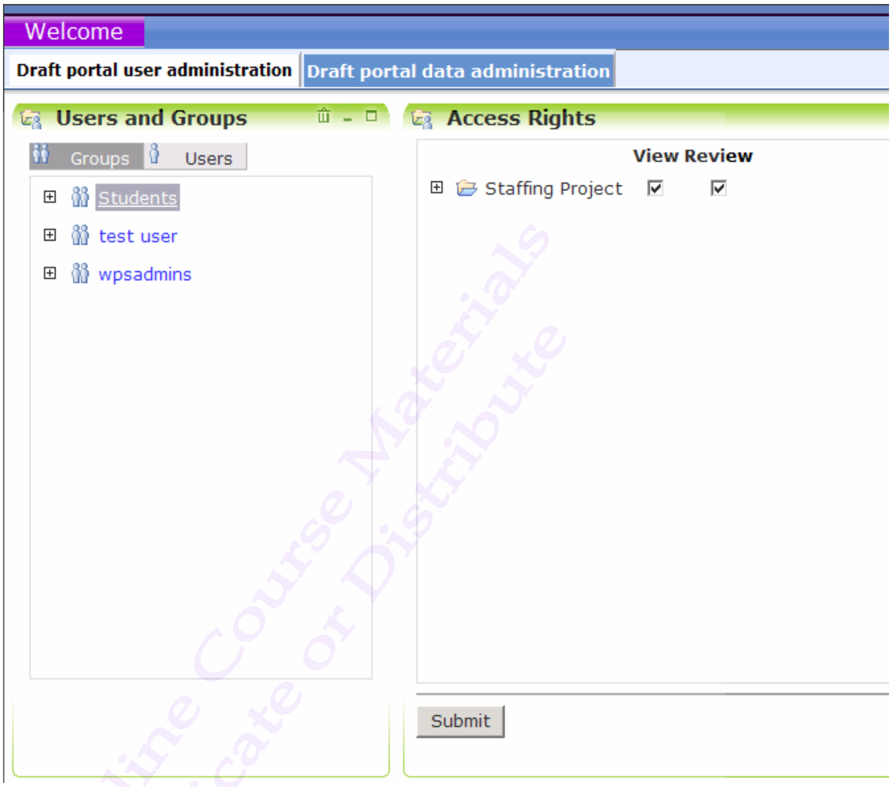
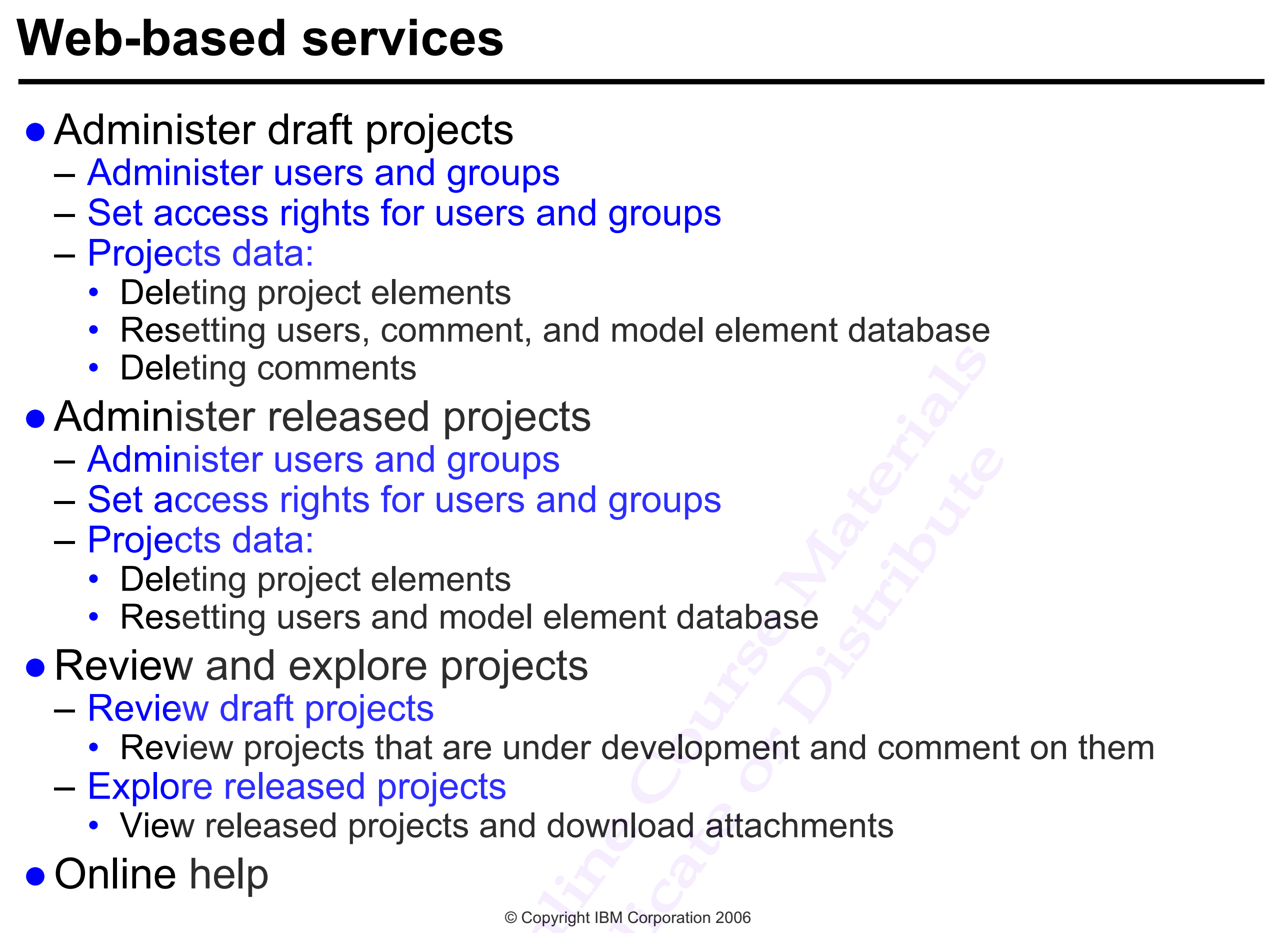


Figure 9-8. User access view VB1861.0

Notes:



Web-based services

- Administer draft projects
  - Administer users and groups
  - Set access rights for users and groups
  - Projects data:
    - Deleting project elements
    - Resetting users, comment, and model element database
    - Deleting comments
- Administer released projects
  - Administer users and groups
  - Set access rights for users and groups
  - Projects data:
    - Deleting project elements
    - Resetting users and model element database
- Review and explore projects
  - Review draft projects
    - Review projects that are under development and comment on them
  - Explore released projects
    - View released projects and download attachments
- Online help

Figure 9-9. Web-based services VB1861.0

Notes:

Web-based services: Administer draft projects

- Administer draft projects
  - Administer users and groups
  - Set access rights for users and groups

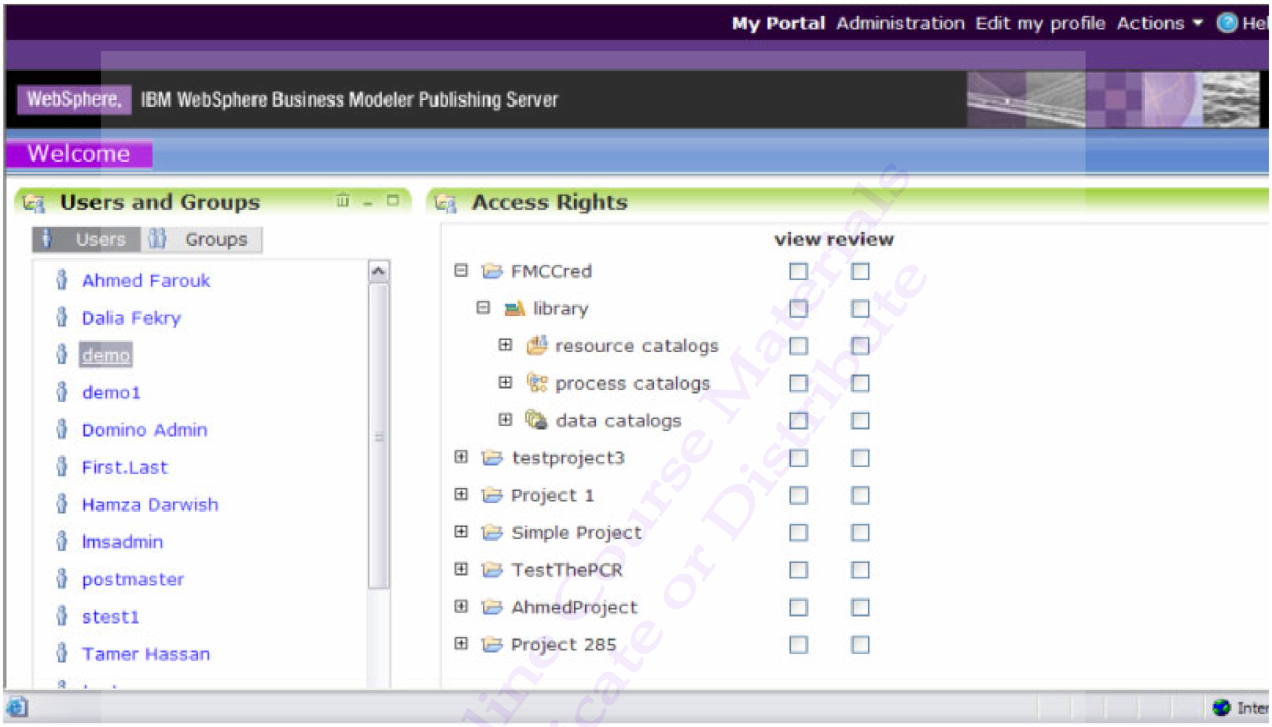


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Figure 9-10. Web-based services: Administer draft projects VB1861.0

Notes:

Web-based services: Administer draft data

- Administer draft data
  - Deleting project elements
  - Resetting users, comments, and model element database
  - Deleting comments

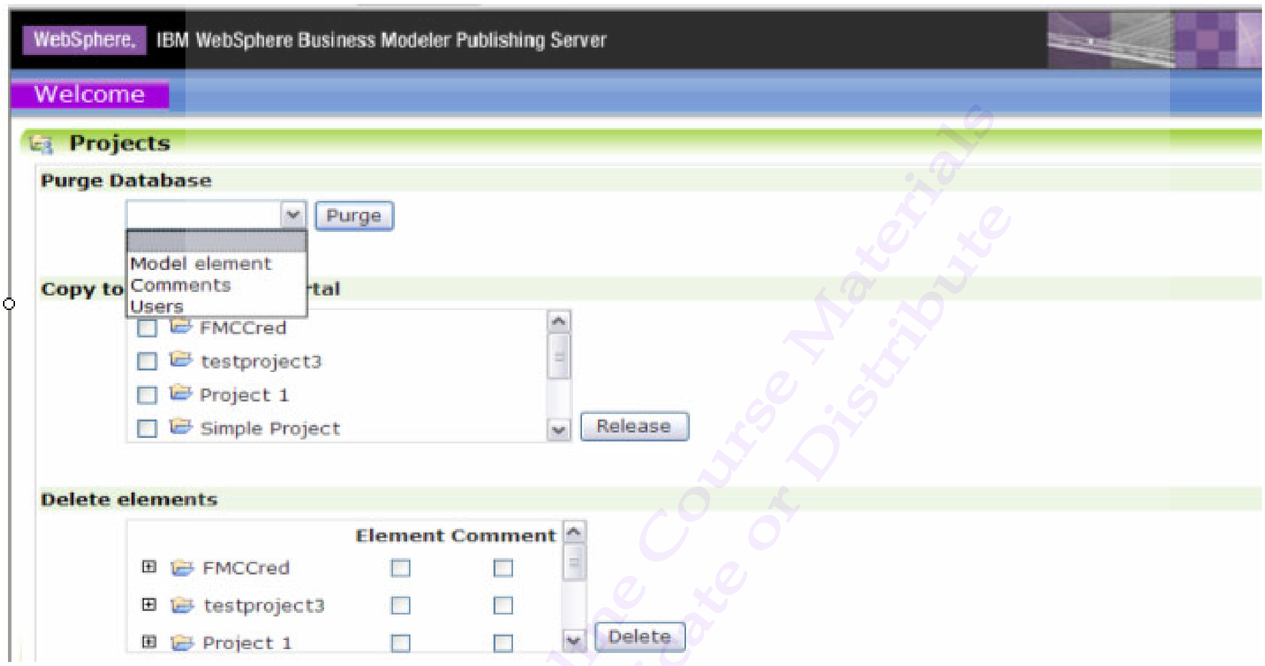
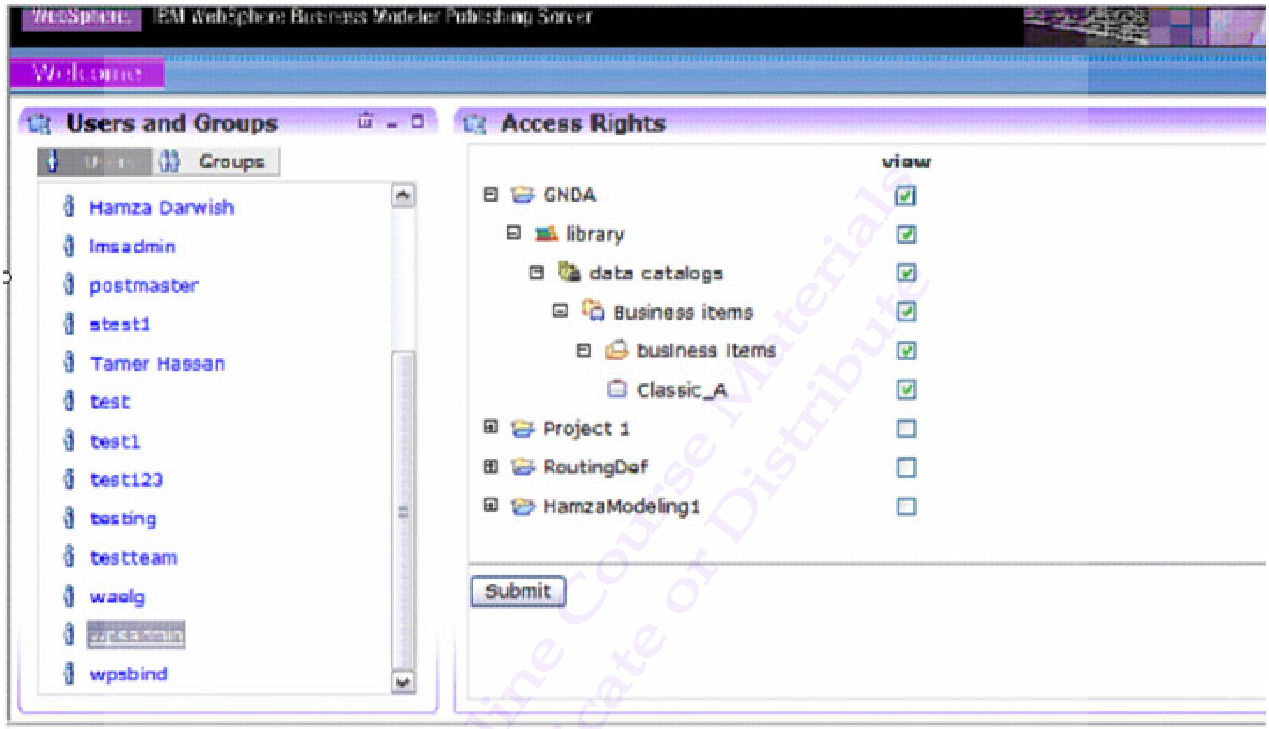


Figure 9-11. Web-based services: Administer draft data VB1861.0

Notes:

Web-based services: Administer released projects

- Administer released projects
  - Administer users and groups
  - Set access rights for users and groups



view

- GNDA ☑
  - library ☑
    - data catalogs ☑
      - Business items ☑
        - business items ☑
          - Classic_A ☑
- Project 1 ☐
- RoutingDef ☐
- HamzaModeling1 ☐

Figure 9-12. Web-based services: Administer released projects VB1861.0

Notes:

Web-based services: Administer released project data

- Administer released project data
  - Deleting project elements
  - Resetting users and model element database

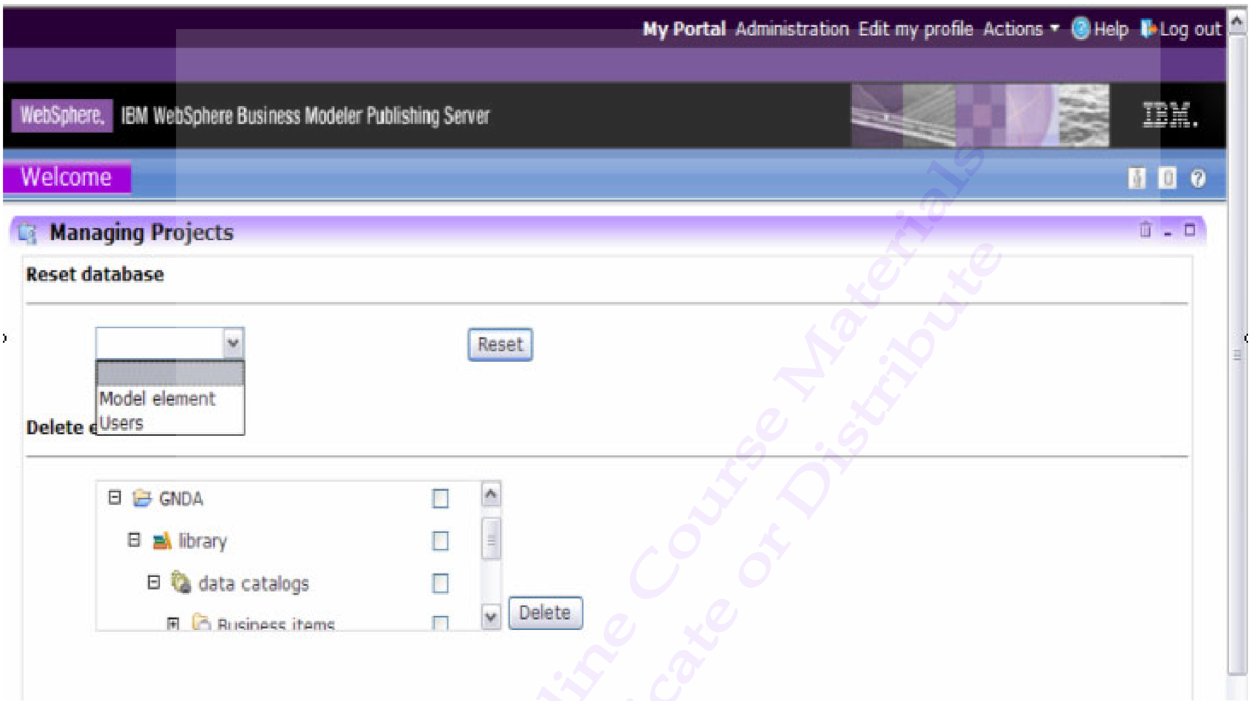


Figure 9-13. Web-based services: Administer released project data VB1861.0

Notes:

Modifying user and group assignments

- Publisher Server is a set of Portlets that are installed into the Portal Server runtime environment.
- When you are installing Publisher Server, you provide some users and groups who are Publisher Server “Administrators”. That is, they are people who can grant view and review permissions to other uses.

Note: A “viewer” can look at projects. A “reviewer” can insert comments into draft projects.

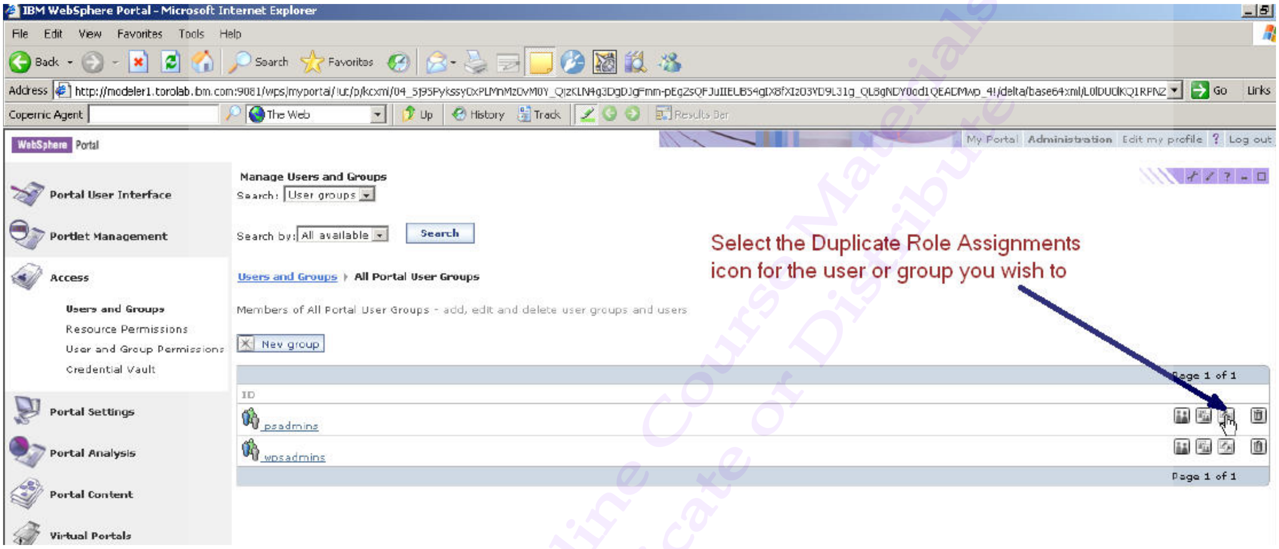
Figure 9-14. Modifying user and group assignments

VB1861.0

Notes:

Understanding permission assignment (1 of 2)

- It may be necessary to add additional users and groups as Administrators after the installation.
- This can be done via the “Duplicate Role Assignments” function of Portal Server’s administration panel.



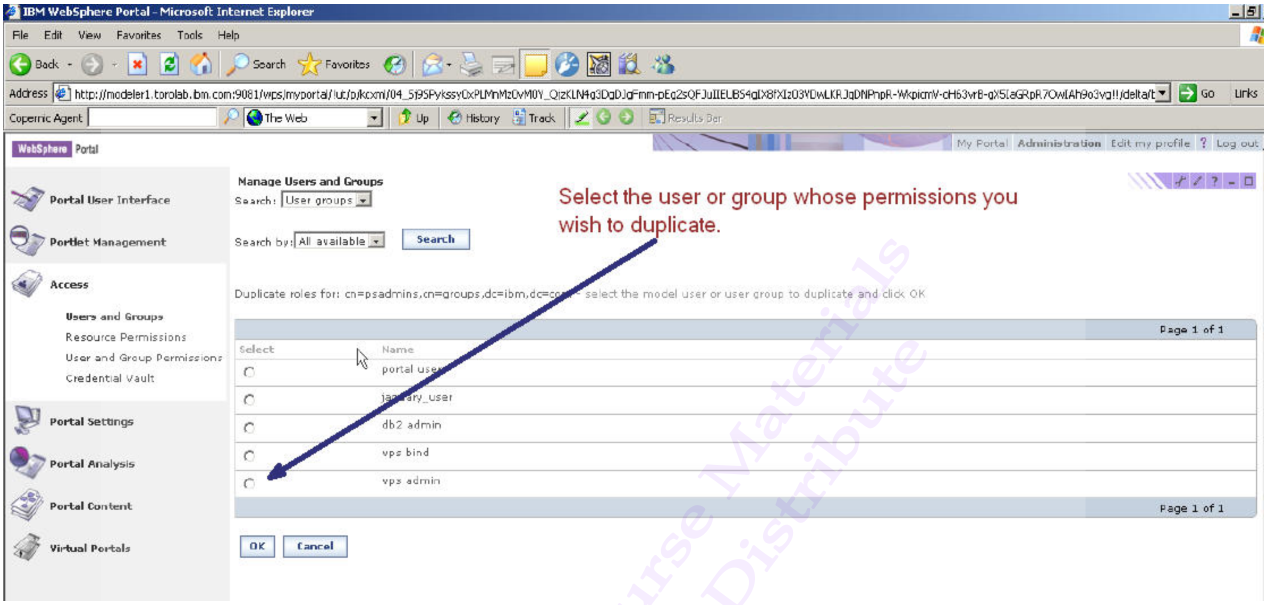
Members of All Portal User Groups - add, edit and delete user groups and users

Select the Duplicate Role Assignments icon for the user or group you wish to

Figure 9-15. Understanding permission assignment (1 of 2) VB1861.0

Notes:

Understanding permission assignment (2 of 2)



Address: http://modeler1.torolab.ibm.com:9081/wps/myportal/!ut/p/kcxml/04_Sj9SPykssy0xPLMnMz0vM0Y_QjzKLN4g3DgDJgFmm-pEg2sQFJuIIELB54gIX8fXIz03YDwLKRJgDNPhpR-WkpicmV-cH63vrB-gX5IaGRpR7OwIAh9o3vg!!/delta/b

Search: User groups

Search by: All available

Duplicate roles for: cn=psadmins,cn=groups,dc=ibm,dc=co - select the model user or user group to duplicate and click OK

Page 1 of 1

Select	Name
○	portal user
○	january_user
○	db2 admin
○	vps bind
○	vps admin

Page 1 of 1

Select the user or group whose permissions you wish to duplicate.

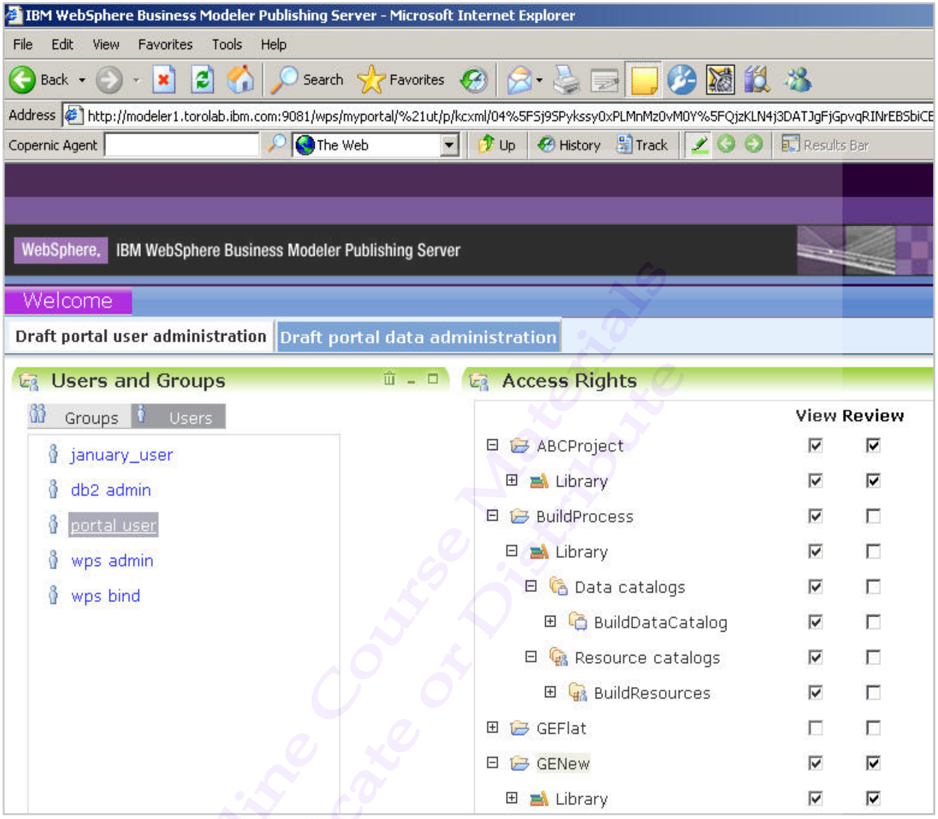
The group "psadmins" will now have the same permissions, including Publisher Server administrator, that wpsadmins has.

Figure 9-16. Understanding permission assignment (2 of 2) VB1861.0

Notes:

Understanding Publisher Server's user registry (1 of 2)

- One of the current limitations with Publisher Server is that the user and group information exists in two repositories, which have no connection or update mechanism.
- Users and groups from the enterprise's LDAP server are available in the Users and Groups portlet of Publisher Server to be assigned to projects as viewers and reviewers.
- That information is stored in Lotus Notes databases.


IBM WebSphere Business Modeler Publishing Server - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites
Address http://modeler1.torolab.ibm.com:9081/wps/myportal/%21ut/p/kcxml/04%5FSj9SPykssy0xPLMnMz0vM0Y%5FQjzKLN4j3DATJgFjGpvqRINrEB5biCE
Copernic Agent The Web Up History Track Results Bar
WebSphere. IBM WebSphere Business Modeler Publishing Server
Welcome
Draft portal user administration
Draft portal data administration
Users and Groups
Groups
Users
Access Rights

Users:
- january_user
- db2 admin
- portal user
- wps admin
- wps bind

Access Rights	View	Review
⊟ ABCProject	☑	☑
⊞ Library	☑	☑
⊟ BuildProcess	☑	☐
⊟ Library	☑	☐
⊟ Data catalogs	☑	☐
⊞ BuildDataCatalog	☑	☐
⊟ Resource catalogs	☑	☐
⊞ BuildResources	☑	☐
⊞ GEFlat	☐	☐
⊟ GENew	☑	☑
⊞ Library	☑	☑

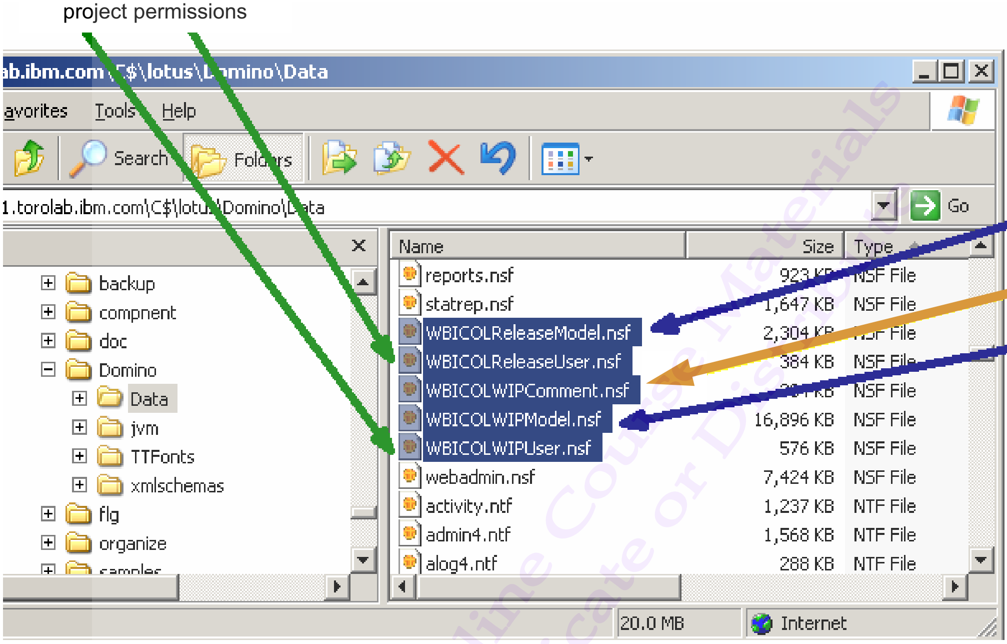
Figure 9-17. Understanding Publisher Server's user registry (1 of 2) VB1861.0

Notes:

Understanding Publisher Server's user registry (2 of 2)

- Publisher Server stores the information about which users and groups have permissions to projects in Domino (Lotus Notes) databases.

Stores user or group to project permissions



Name	Size	Type
reports.nsf	923 KB	NSF File
statrep.nsf	1,647 KB	NSF File
WBICOLReleaseModel.nsf	2,304 KB	NSF File
WBICOLReleaseUser.nsf	384 KB	NSF File
WBICOLWIPComment.nsf	[illegible] KB	NSF File
WBICOLWIPModel.nsf	16,896 KB	NSF File
WBICOLWIPUser.nsf	576 KB	NSF File
webadmin.nsf	7,424 KB	NSF File
activity.ntf	1,237 KB	NTF File
admin4.ntf	1,568 KB	NTF File
alog4.ntf	288 KB	NTF File

Stores the actual models

Stores the comments

Figure 9-18. Understanding Publisher Server's user registry (2 of 2) VB1861.0

Notes:

Summary

Having completed this unit, you should now be able to:

- Explain the architecture overview of WebSphere Business Modeler Publishing Server
- Discuss the function of administration portals
- Modifying user and group assignments

Figure 9-19. Summary VB1861.0

Notes:

Unit 10.Summary of simulation and analysis

What this unit is about

This unit describes the summary of simulation and analysis.

What you should be able to do

After completing this unit, you should be able to:

- Review key points in the course:
  - Process simulation
  - Dynamic analysis
  - Process improvement
  - Custom queries and reports
  - Publishing server administration

Objectives

Review key points in course:

- Process simulation
- Dynamic analysis
- Process Improvement
- Custom queries and reports
- Publishing server administration

Figure 10-1. Objectives VB1861.0

Notes:

Using the process editor in WebSphere Business Modeler

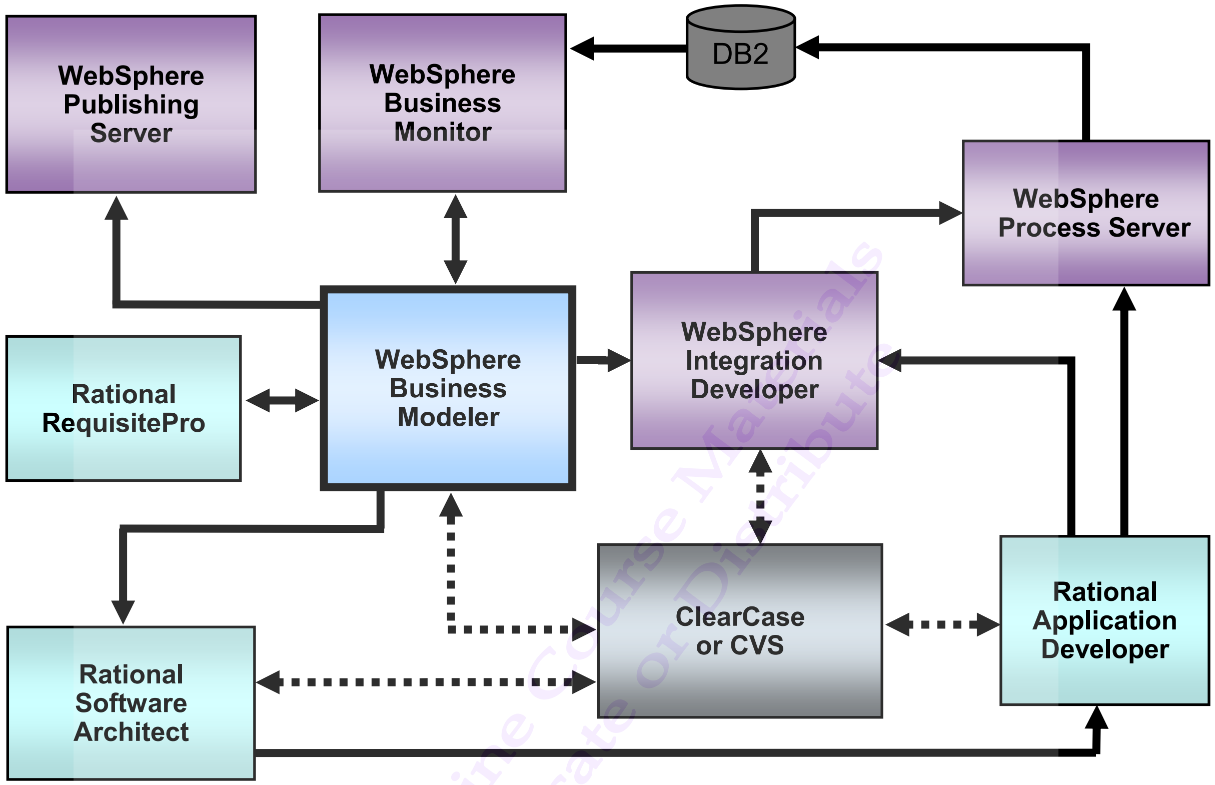

WebSphere Publishing Server
WebSphere Business Monitor
DB2
WebSphere Process Server
Rational RequisitePro
WebSphere Business Modeler
WebSphere Integration Developer
ClearCase or CVS
Rational Application Developer
Rational Software Architect

Figure 10-2. Products covered in this course

VB1861.0

Notes:

Legend:

- - - - - - Version control flow (dashed line)

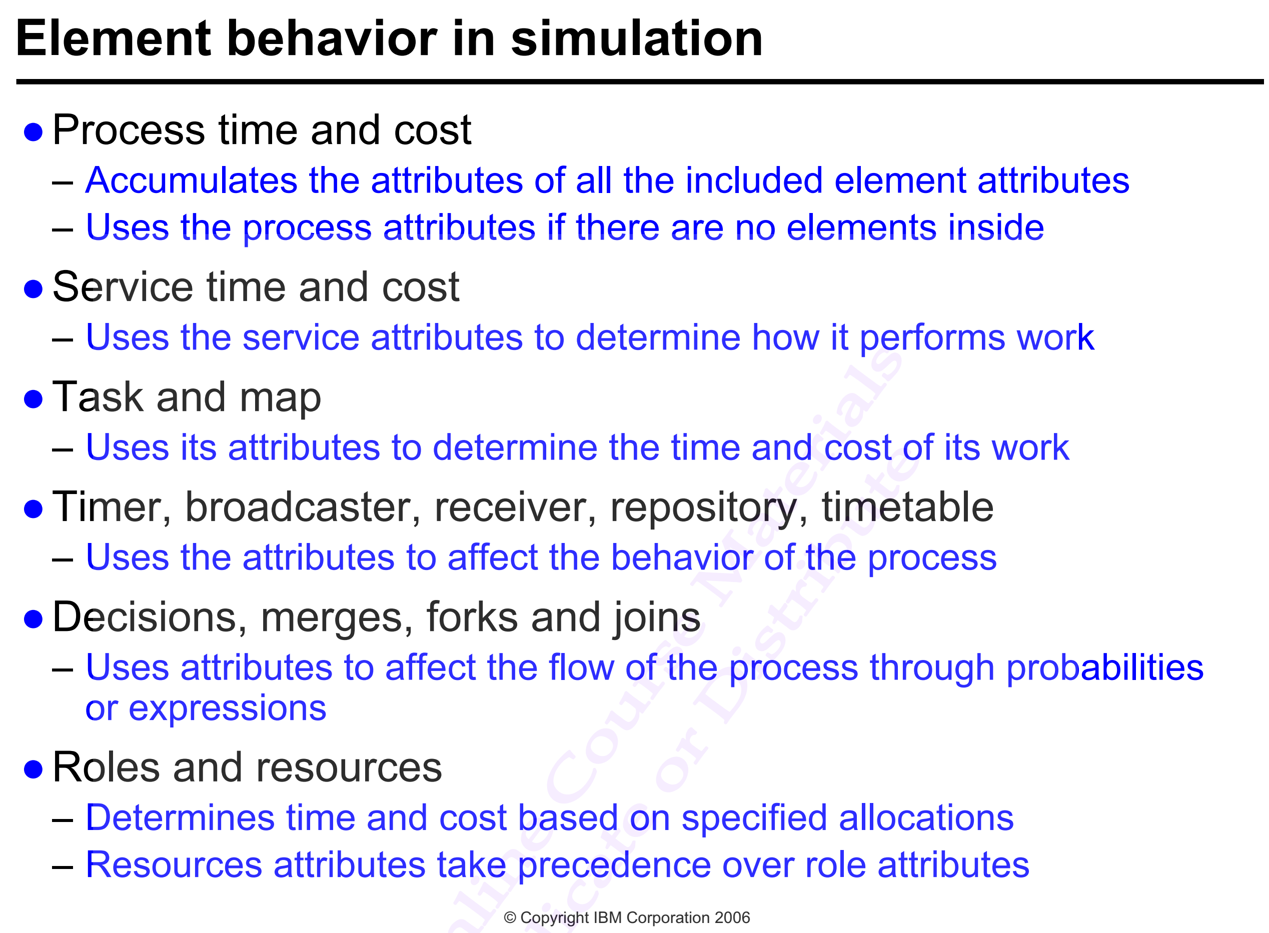
——— Development flow (solid line)

Simulation terminology

- Simulation snapshot
  - A record of the model that will be simulated
- Simulation profile
  - A record of the model plus the simulation attributes
- Statistics and results
  - The information that comes out of the simulation
- Probabilities or expressions
  - The way decisions are handled during simulation
- Tokens
  - Represent units of work passing through the process
- Process instances
  - Each execution of a process in a simulation
- Process cases
  - Each path through a process
- Random number generation
  - The introduction real-life variability into a simulation

Figure 10-3. Simulation terminology VB1861.0

Notes:



Element behavior in simulation

- Process time and cost
  - Accumulates the attributes of all the included element attributes
  - Uses the process attributes if there are no elements inside
- Service time and cost
  - Uses the service attributes to determine how it performs work
- Task and map
  - Uses its attributes to determine the time and cost of its work
- Timer, broadcaster, receiver, repository, timetable
  - Uses the attributes to affect the behavior of the process
- Decisions, merges, forks and joins
  - Uses attributes to affect the flow of the process through probabilities or expressions
- Roles and resources
  - Determines time and cost based on specified allocations
  - Resources attributes take precedence over role attributes

Figure 10-4. Element behavior in simulation VB1861.0

Notes:

Simulation snapshot

- The simulation snapshot opens in a tab over the process editor
  - Snapshot name
    - Rename to document settings
  - Simulation attributes
    - Define the simulation behavior
  - Token animation
    - Watch the movement of tokens
    - Look for bottlenecks
  - Activity color
    - Changes color when active
  - Instances
    - Displays number of instances
  - Queue
    - Number of tokens waiting
    - Each bar represents two tokens
  - Animation is not necessary
    - Turning off shortens execution time

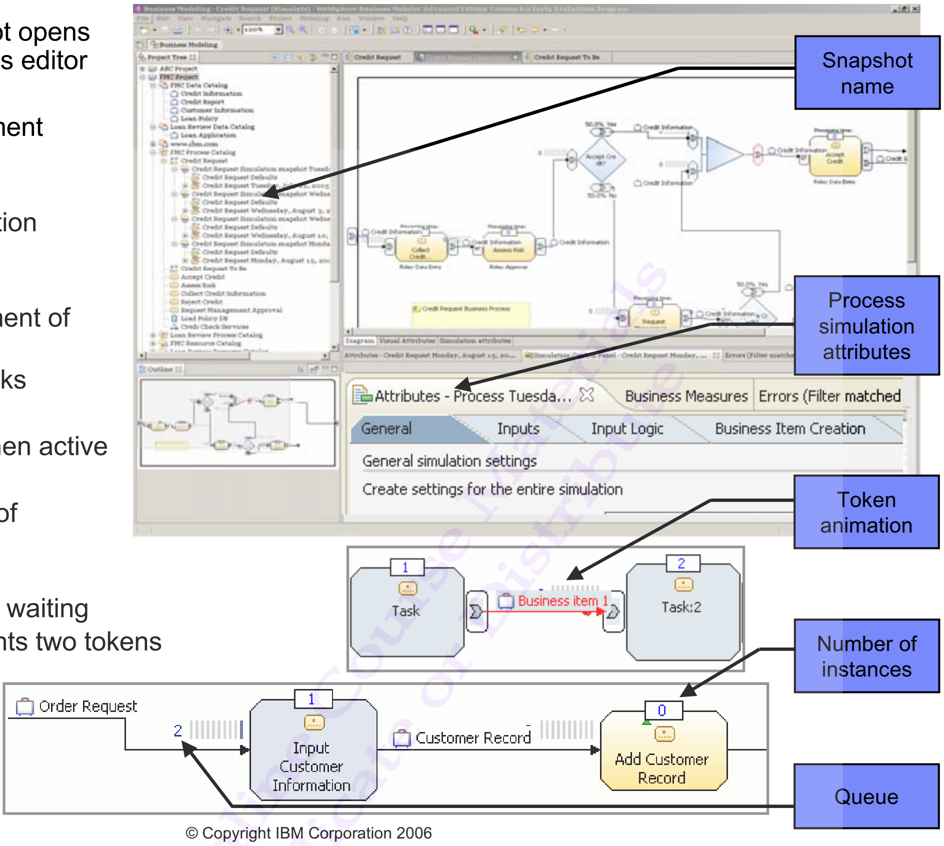


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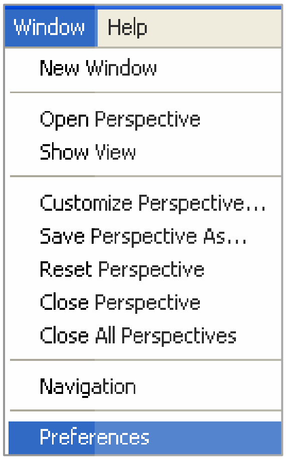
Figure 10-5. Simulation snapshot VB1861.0

Notes:

Simulation preferences

- Highest level
  - From the tool bar



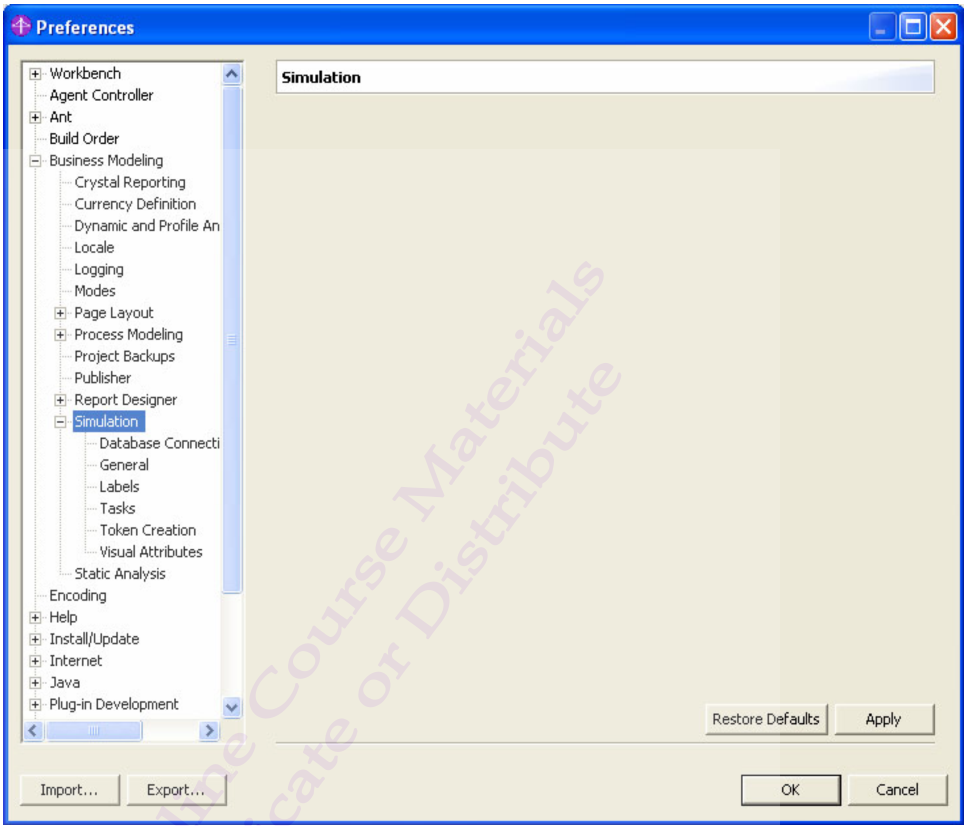


Figure 10-6. Simulation preferences VB1861.0

Notes:

Where are distributions used?

- In Modeler, probability distributions can be assigned to:
  - Token creation
  - Task completion times
  - Task costs
  - Task revenue

- Applying distribution settings to a model in the appropriate places enables greater accuracy in the representation of the process.

Figure 10-7. Where are distributions used? VB1861.0

Notes:

Dynamic analysis

- Profile analysis
  - Profile specification
  - Cases summary

- Dynamic analysis
  - Aggregated
  - Process instance
  - Process cases
  - Process comparison

Figure 10-8. Dynamic analysis VB1861.0

Notes:

Process goal analysis

- Process goals are derived from specific organization goals and customer requirements
  - Organizations achieve their goals through the operations of their processes

- Process goal analysis is used to analyze a process to determine how well it supports the organization’s goals
  - The performance of the process is analyzed and evaluated against its goals
  - Allows the focus to be set on increasing the probabilities of process cases that support organizational goals
    - Therefore, reducing the probabilities of cases that do not support goals

Figure 10-9. Process goal analysis VB1861.0

Notes:

Redesign analysis

- Shows the effects of adding tasks to, or deleting tasks from, a process during the redesign phase
- Use redesign analysis when you need to:
  - Identify improvement opportunities within a process
  - Measure the effects of redesigning a process

Figure 10-10. Redesign analysis VB1861.0

Notes:

Custom reports

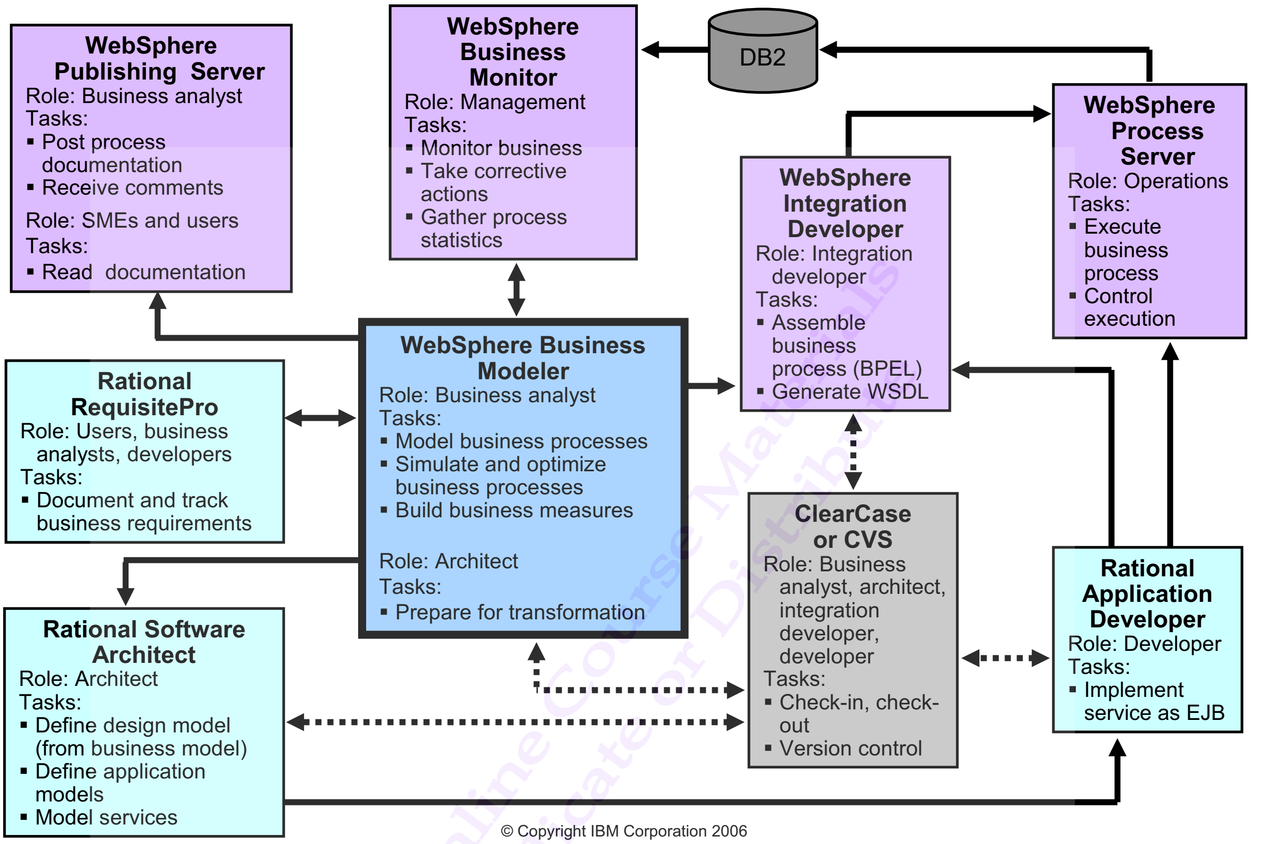
- Reports are a formatted presentation of information relating to a model or to the results of analyzing a process simulation
  - Predefined report details
    - Numerous predefined reports available in the product
  - Custom reports — report designer
    - Report catalogs
      - Organize report templates for different projects or uses
    - Report templates
      - Produce detailed reports with specific content in a specified format
    - Report style masters
      - Reuse header and footer content for multiple report templates

- Crystal Reports
  - Alternative way of creating and generating report templates

Figure 10-11. Custom reports VB1861.0

Notes:

Modeler and its related products



WebSphere Publishing Server
Role: Business analyst
Tasks:
- Post process documentation
- Receive comments

Role: SMEs and users
Tasks:
- Read documentation

WebSphere Business Monitor
Role: Management
Tasks:
- Monitor business
- Take corrective actions
- Gather process statistics

WebSphere Process Server
Role: Operations
Tasks:
- Execute business process
- Control execution

WebSphere Integration Developer
Role: Integration developer
Tasks:
- Assemble business process (BPEL)
- Generate WSDL

Rational RequisitePro
Role: Users, business analysts, developers
Tasks:
- Document and track business requirements

WebSphere Business Modeler
Role: Business analyst
Tasks:
- Model business processes
- Simulate and optimize business processes
- Build business measures

Role: Architect
Tasks:
- Prepare for transformation

ClearCase or CVS
Role: Business analyst, architect, integration developer, developer
Tasks:
- Check-in, check-out
- Version control

Rational Application Developer
Role: Developer
Tasks:
- Implement service as EJB

Rational Software Architect
Role: Architect
Tasks:
- Define design model (from business model)
- Define application models
- Model services

Figure 10-12. Course evaluation VB1861.0

Notes:

Appendix A. Modeler glossary

This glossary defines the terms used in IBM WebSphere Business Modeler.

A

activities by classifier analysis

> Static analysis that lists the activities in a process that are associated with each classifier value.

activities by location analysis

> Static analysis that lists the allocations of locations to activities in a process.

activities by organization unit analysis

> Static analysis that lists the allocations of organization units to activities in a process.

activities unable to start analysis

> Static analysis that lists the activities in a process model that might not run due to empty input criteria, unavailable resources, or unavailable inputs.

activity

> Work performed in a business process. Processes, tasks, services, and loops are examples of activities.

activity cost analysis

> Dynamic analysis that displays the average costs incurred by all instances of each activity in a simulated process, including the average revenue, run cost, wait cost incurred while waiting for resources, allocated resource cost, total cost, and profit.

activity cost and duration analysis

> Static analysis that lists the cost and minimum working duration of each action in a process based on the resource requirement for the action.

activity cost per time unit analysis

> Dynamic analysis that displays the average cost per time unit for all instances of each activity in a simulated process. The costs that this analysis displays include the average processing cost, wait cost incurred while waiting for resources, and total cost.

activity duration analysis

> Dynamic analysis that displays the average times for all instances of each activity in a simulated process, including the average elapsed durations, processing durations, wait time, delay time, and throughput.

activity resource allocation analysis

Dynamic analysis that displays the resources allocated for all instances of each activity in a simulated process. This analysis lists each resource with the average allocation time, cost, and shortage.

activity resource and role leveling analysis

Static analysis that compares the number of required resources or roles to the number of available resources or roles for each activity in a process.

activity statistics analysis

Dynamic analysis that displays activity statistics for all instances of each activity in a simulated process, including the number of times each task ran successfully, and the number of times each task failed or timed out.

activity throughput analysis

Static analysis that lists the throughput (quantity of work items processed in a unit of time, such as 30 work items per hour) of each activity in a process based on its required resources, and calculates the maximum throughput that can be reached if the allocated resources are increased.

ADF

Activity Decision Flow. The format in which models are exported from WebSphere Business Integration Workbench 4.2.4. These models can be imported into WebSphere Business Modeler.

aggregate metric

A metric that is calculated by finding the average, maximum, minimum, sum, or number of occurrences of an instance metric across multiple runs of a process. Examples of aggregate metrics are an average order amount, a maximum order amount, a minimum order amount, the total order amount, or the number of occurrences of $500 for an order amount.

aggregated analysis

A category of dynamic analysis that provides summary results from a simulation run.

alert

A notification used in WebSphere Business Monitor to warn an observer of a business situation that might require action. Alerts are received and displayed in the Alerts view of WebSphere Business Monitor dashboards. Using Adaptive Action Manager, you can configure an alert to lead to an action, such as sending an e-mail.

Alerts view

A dashboard view in WebSphere Business Monitor that displays alerts to notify users of conditions that might warrant business actions.

annotation

An explanatory note or comment. Annotations can be added to a diagram or attached to elements in the diagram.

asynchronous

A way of calling an activity in which the calling process does not wait for the activity to complete.

attribute

A property, quality, or characteristic that can be associated with a business process element or program function. Examples include a cost or location attribute for a resource in a process model, or a paper-size attribute that affects how a diagram prints.

availability

The time periods during which a resource is accessible. When a resource is available, it can satisfy a resource requirement of a task. For example, a contractor might have an availability of 9 a.m. to 5 p.m. every weekday, and 9 a.m. to 3 p.m. on Saturdays.

B

basic type

A type whose values have no identity (that is, they are pure values). Basic types include Integer, Boolean, and String.

BPEL

See Business Process Execution Language.

branch

A distinct path leading to or originating from an element in a process model. Decisions and forks have one input branch and multiple output branches. Joins and merges have multiple input branches and one output branch.

breakpoint

A marker that can be applied to an activity in a simulated process. When an *activity* with a breakpoint is triggered in a simulation run, the simulation pauses until the user restarts it.

bulk resource

A collection of resources in which the individual elements are not or do not need to be uniquely identified. Bulk resources are used when a quantity of a resource is required for a task. For example, a task might require ten employees or ten liters of water. Bulk resources can be non-consumable (such as employees, vehicles, or equipment) or consumable (such as fuel or printer paper). Consumable resources are diminished or used up during the process.

bundle

A set of *tokens* that are transferred between nodes in a simulation as a complete group.

business analyst

A specialist who analyzes business needs and problems, consults with users and stakeholders to identify opportunities for improving business return through information technology, and transforms requirements into a technical form.

business group

A place to collect any elements that you would like to group together. You can create different business groups for companies, processes, parts of processes, or any other grouping that reflects the way you want to work.

business item

A business document, work product, or commodity that is either produced by a task or process (such as an invoice) or causes a process to start (such as a customer inquiry). Other examples of business items are manufacturing order, mother board, power supply, and memory chip (in a PC assembly process), itinerary and customer information record (in a trip reservation process), and passenger (in a transportation process). You can use a business item directly in a process, or you can create an instance of it.

business item instance

A particular occurrence or example of a business item. If you defined a business item called Invoice, then an example of a business item instance would be “Invoice #1473.”

business item specification query

A predefined query that shows the information in the specification for one or more selected business items.

business item template

A category used to model a group of business items that share common properties. After these properties are defined in the template, they are inherited by all business items using the template. For example, an organization might define a number of forms to be used in human resource (HR) processes, all of which have fields for date, employee number, HR form number, and HR administrator.

business measure

A measure that describes the performance management aspects of a business that are required for real-time business monitoring. Business measures include aggregate and instance metrics and KPIs.

business objective

An executive statement of direction in support of a corporate strategy. A business objective is a high-level goal that is quantifiable, measurable, and results oriented.

business operations

The ways in which an organization operates, including its processes and organizational structure. For example, an organization might have a management structure and processes defined for everything from taking vacation days to submitting travel expenses.

Business Process Execution Language

An XML-based language for the formal specification of business processes and business interaction protocols. Business Process Execution Language (BPEL) extends the Web services interaction model and enables it to support business transactions.

business service

A representation of a Web Service Definition Language file (.wsdl) imported into WebSphere Business Modeler to define existing Web services. A business service is a collection of *business service definitions* that can include *business service objects*.

business service definition

A representation of the WSDL PortTypes in a business service. A business service definition describes a specific set of *business service operations* that are used to perform related business functionality.

business service object

A representation of an XML schema file (.xsd) imported into WebSphere Business Modeler. There are inline XML schemas and schema types within WSDL files. A business service object is a collection of *business service object definitions* and *business service object templates*.

business service object definition

A representation of the WSDL ComplexType in an inline schema, or the XML schema type (SimpleType, ComplexType, Anonymous ComplexType, or Anonymous SimpleType) in an XML schema file. There are inline XML schemas and schema types within WSDL files. A business service object definition is similar to a *business item* and is used to define the business data that is required when a *business service operation* is invoked.

business service object template

A representation of an XML schema ComplexType that has the abstract attribute set to true. There are inline XML schemas and schema types within WSDL files. The business service object template is similar to a *business item template* and abstractly defines the business data that is required when a *business service operation* is invoked.

business service operation

A representation of the WSDL Operation in a business service definition. A business service operation describes a business function and includes the *business service object definitions* that are required when the operation is invoked. A business service operation also describes the *business service object definitions* that result from completing the business service operation. For example, a Product Search business service operation requires a Product name (a *business service object definition*) and returns a Product *business service object definition*. Business service operations can be added to process diagrams as non-editable services.

C

case

A specific run path in a process that contains multiple possible paths.

catalog

A container that, depending on the container type, holds processes, data, resources, organizations, or reports in the Project Tree view.

category

A container that allows you to represent qualities of elements in a *structure* diagram.

chart series

A selection of a category of data that will be represented by a chart in a report. A chart can have multiple chart series to represent multiple types of data.

classifier

A group name that can be assigned to a task or other process element to categorize the element. Predefined classifiers are provided to classify elements by quality control, value added, and workflow.

comparison analysis

A category of dynamic analysis that allows you to compare the weighted average analysis results for two simulated processes that use the same input parameters.

condition

An expression that can be evaluated to either true or false. A condition can be expressed in natural language text, mathematically formal notation, or in a machine-readable language.

connection

A link between two elements. Connections can be used to specify the chronological sequence of activities in a process.

correlation condition

A condition used to correlate input to a particular runtime instance of a task or process. For example, if there are multiple instances of a single task already running, and new input arrives that could be delivered to a running instance, then the correlation condition is used to identify the task instance that should receive the input.

critical path

The series of activities that must occur as scheduled for the completion date of a case to be met. The critical path is the path among parallel paths (in the same case) with the longest duration. Each path considered begins at a start node, or an input to the process, and ends at a stop node.

CVS

Concurrent Versions System. An open-source, network-transparent version control system.

cycle time

The time between the beginning and end of a process instance in a process simulation. Cycle time includes wait time while an activity in the process waits for a resource to become available.

D

dashboard

A container (portal page) that can contain one or more views (portlets). In WebSphere Business Monitor, a dashboard enables users to monitor business performance through a set of views.

data catalog

A collection of models representing objects, such as business items and notifications, to be used as inputs and outputs in process modeling.

data model

A model defining the structure of business artifacts that business operations operate on.

database schema

A collection of database objects, such as tables, views, indexes, or triggers, that define a database. A database schema provides a logical classification of database objects.

decision

A process element that routes an input to one of several alternative outgoing paths, depending on its condition. A decision is like a question that determines the exact set of activities to perform during a process run. Questions might include "What type of order?" and "How will the order be shipped?"

delimited text

A file format that consists of text separated into meaningful chunks by specific characters. The chunks of text are typically individual fields. The specific character is called a delimiter, and can be any character that is not found in the text. The comma and tab are common delimiters. If the delimiter is used as a character in the text, it must be enclosed in a pair of text qualifiers, typically double quotation marks.

dimension

A data category that is used to organize and select instances for reporting and analysis. Some examples of dimensions are time, accounts, products, and markets.

Dimensional view

A dashboard view in WebSphere Business Monitor that generates multidimensional reports that analyze different business aspects of data.

distribution

The relative number of times each possible outcome will occur in a number of trials.

do-while loop

A loop that repeats the same sequence of activities as long as a condition is true. Unlike a while loop, a do-while loop tests its condition at the end of the loop. This means that its sequence of activities always runs at least once.

downstream

Indicates the position of a subsequent element or activity in the process flow relative to a particular point. An activity in a process receives inputs from upstream nodes, and sends outputs to other downstream nodes.

dynamic analysis

The process of extracting targeted types of information based on the results of process simulations. Dynamic analysis can be run only if simulation results are available.

E

elapsed duration

The difference between the start time and the end time of a task or a process, which might include wait time as well as processing time. If a task instance is created, but one or more required resources are unavailable, the elapsed duration will be longer than the working duration.

element

A distinct, self-contained unit of a business process model. Examples of elements are tasks, projects, snapshots, resources, and connections.

end node

A visual marker in a process that identifies where a particular flow in that process ends. Other concurrent flows in the same process will continue running.

entity

An element in a *structure* diagram, such as a business item instance, an organization unit, or a resource.

entity structure analysis

Static analysis that displays the occurrences of a selected instance (such as a business item instance, an organization unit, or a resource) within a selected set of *structures*.

F

FDL

FlowMark Definition Language. An external format for defining programs, data structures, and workflow models in a flat text file. Models exported from WebSphere Business Modeler in FDL format can be imported into IBM WebSphere MQ Workflow.

filter expression

An optional expression that a notification receiver uses to filter the notification instances that it will accept. The notification receiver listens for a particular type of notification, and it will only accept notification instances that meet the criteria specified by the filter expression.

flow

The representation of interdependencies between activities in a structured format. In WebSphere Business Modeler, the flow always moves forward in time.

for loop

A loop that repeats the same sequence of activities a specified number of times.

fork

A process element that splits the process flow into two or more concurrent paths, enabling two or more tasks to be performed in parallel. A fork makes copies of its inputs and forwards them along each of the paths. Forks typically precede joins.

free float

A period of time in a process flow after a task runs and before the subsequent task can begin to run. Free floats might result from parallel paths in a process that take varying lengths of time to complete.

G

Gauge view

A dashboard view in WebSphere Business Monitor that helps you visualize information by representing a KPI value on a gauge, like a speedometer.

global element

Available to any process within its own project. A global element is displayed in the Project Tree view and can be used in multiple processes. Tasks, processes, and repositories can be either global (referenced by any process in the project) or local (specific to a single process).

I

individual resource

A single resource that can be uniquely identified, such as a person or computer. Individual resources are used when a specific resource must be allocated to a task. For example, the Mary Smith resource must perform the Approve Payment task.

information repository

See repository.

inline schema

An XML schema in a Web Service Definition Language file (.wsdl).

input

An entry point through which an element is notified that it can start, typically because an upstream element on which it depends has finished running. If the element has all of its required inputs, then it will start.

input branch

The branch of a decision, fork, join, or merge that contains the inputs.

input criteria

Number and types of inputs required to start a task or process. The singular form is *input criterion*.

input and output paths analysis

Static analysis that displays the paths that lead to and from a specified point in a process.

instance

A particular occurrence or example of something.

instance metric

A metric that returns the result, such as the amount of an order, from one run of the process.

Instances view

A dashboard view in WebSphere Business Monitor that displays instance metrics.

internal rate of return

The interest rate received for an investment based on anticipated expenses and income that will occur at regular periods.

interrupt

A condition that applies to a simulation that causes the simulation run to stop if the condition is met.

J

join

A process element that recombines two or more parallel control flow paths that all must complete before a single control flow continues along a single path to a common process element. A join also synchronizes data flow, waiting for input to arrive at each of its incoming branches. The join does not recombine business items, so each business item from the join is permitted to continue. Joins typically follow forks.

K

key

A character or set of characters used to identify an item or group of items. For example, the user ID is the key to identify a user file record.

key performance indicator

A significant measurement used to track performance against a business objective. A key performance indicator (KPI) has a target or ranges, or both, to measure the improvement or deterioration in the performance of an activity that is critical to the business.

KPI

See key performance indicator.

KPI view

A dashboard view in WebSphere Business Monitor that shows the details of the modeled KPIs, such as the KPI value relative to the defined ranges and the target, if applicable, and the status of the KPI.

L

library

A container for the model elements, including business items, processes, tasks, resources, and organizations. The library node is visible only in the Project Tree view if all filters are turned off. It is used to differentiate the business groups from the complete set of available elements in a project.

local

Available only within its own process. A local element exists only as long as the process does. Tasks, processes, and repositories can be either global (referred to by any process in the project) or local (specific to a single process).

location

A particular occurrence or example of a location definition. If you have a location definition called USA Call Center, an example of a location would be Toledo Call Center.

location definition

A destination that is relevant to the model. Location definitions can be street addresses, cities, areas, or countries. For example, a model could show various branch offices or customer locations. You can use location definitions directly in a process, or you can create a location (an instance) based on the location definition.

location definition template

A category used to model a group of locations that share common properties. After these properties are defined in the template, they are inherited by all locations using the template. For example, an organization might define a number of sales office locations, all of which share properties (such as monthly rent and square footage) that are defined in a sales office location definition template.

location specification query

A predefined query that shows the information in the specification for one or more selected locations.

loop

A repeating sequence of activities in a process.

M

map

A map is a specialized task that transforms data from one structure to another. A map is provided for diagram purposes only.

matrix analysis

Static analysis that displays associations between all examples of two different types of model elements that you specify (such as resources and roles).

measure

The dimensions, capacity, or amount of something ascertained by measuring. See also business measure.

merge

A process element that recombines multiple processing paths, typically after a decision. A merge brings several alternative paths together.

metric

A container for information, usually a business performance measurement.

model

A representation of a process, system, or subject area, usually developed for understanding, analyzing, improving, and replacing the item being represented. A model can include a representation of information, activities, relationships, and constraints.

monitored values

The values that you want WebSphere Business Monitor to return after the process has been monitored.

N

net present value

The estimated monetary value of an investment based on expected returns and expected costs, where these expected returns and expenses are discounted by a rate that reflects inflation and opportunity costs.

node

A shape in a diagram. Nodes are the fundamental shapes that make up a diagram, and connections are created among them.

notification

An occurrence in a process that can trigger an action. A notification can be used to model conditions of interest that are to be transmitted from a sender to a (typically unknown) set of interested parties (the receivers).

notification broadcaster

A specialized task that publishes *notifications*. A notification broadcaster acts as a publisher. When a notification is broadcast, any *notification receiver* within its scope that is listening for (subscribing to) that notification receives it.

notification receiver

A specialized task that listens for *notifications*. A notification receiver acts as a subscriber. When it receives a notification, it produces the output that has been modeled, and then terminates.

notification specification query

A predefined query that shows the information in the specification for one or more selected notifications.

notification template

A category used to model groups of *notifications* that share common properties. After these properties are defined in the template, they are inherited by all notifications using the template. For example, the notifications signaling "fire alarm," "burglar alarm," and "power outage, might share a template called "alarm notification" that defines common properties for these notification types, such as date, time, and detecting sensor location.

O

observer

A task that watches a process and its associated repositories, and produces output when a certain condition becomes true (for example, a threshold value has been reached).

organization

An entity where people cooperate to accomplish specified objectives. For example, an organization can be an enterprise, a company, or a factory.

organization catalog

A collection of models representing organizations, to be used in process modeling.

organization definition

An organization that is relevant to the model. Organization definitions can be companies, departments, or workgroups. You can use organization definitions directly in a process, or you can create an organization unit (an instance) based on the organization definition.

organization definition template

A category used to model a group of organizations that share common properties. After these properties are defined in the template, they are inherited by all organizations using the template. For example, a company might define a number of sales organizations, all of which share properties (such as area covered and number of employees) that are defined in a sales office organization template.

organization unit

A particular occurrence or example of an organization definition. If you have an organization definition called Department, an example of an organization unit would be Sales and Marketing.

organization unit specification query

A predefined query that shows the information in the specification for one or more selected organization units.

output

An exit point through which an element can inform downstream elements that they can now start.

output branch

The branch of a decision, fork, join, or merge that contains the outputs.

output criteria

Number and types of outputs required for a task or process to complete. The singular form is *output criterion*.

P

path

A route that the flow might take through the activities in a process. There might be several alternative paths.

path cycles analysis

Static analysis that displays a list of the paths in a process that have a closed loop of connectors and activities.

paths unable to be followed analysis

Static analysis that displays the paths in a process model that might not run due to empty input criteria, unavailable resources, or unavailable inputs.

postcondition

A definition of what must be true when a task or process ends.

precondition

A definition of what must be true when a task or process starts.

preference

A setting for a condition or behavior associated with an aspect of product configuration or function. For example, preferences might store network settings for a team development environment, or contain default settings for new elements.

process

Any activity performed within a company or organization. In the context of WebSphere Business Modeler, a process is a progressively continuing procedure consisting of a series of controlled activities that are systematically directed toward a particular result or end.

process activities total time analysis

Weighted average case analysis that displays the average total elapsed duration of task instances that are involved in the process instances corresponding to each case. This analysis also displays the weighted average elapsed duration across all cases.

process break even analysis

Weighted average case analysis that calculates the number of times a process must run to generate a profit that recovers a specified fixed cost.

process case

A specific path in a business process, based on outcomes of decisions.

process cases analysis

A category of dynamic analysis that displays details of all generated process instances and weighted average values across all cases calculated according to the distribution of process instances to each case.

process cases summary analysis

Weighted average case analysis that displays summary details for all the process cases that are produced during the simulation of a process.

process catalog

A collection of models representing processes, tasks, and repositories.

process cost analysis

Weighted average case analysis that displays a list of process cases and the average revenue, average run cost, average wait cost incurred while waiting for resources, average allocated resources cost, and average profit for the process instances running through each possible path (case). This analysis also displays an weighted average of the analyzed costs across the various process cases.

process details query

A predefined query that shows information about a process, including the catalog, resources, roles, organization units, locations, and business items that are associated with the process.

process diagram

A visual representation that illustrates the flow of work for a process. The objects in a process diagram include tasks, processes, connections, business items, resources, and decisions.

process duration analysis

Weighted average case analysis that returns a list of the process instances and shows the elapsed duration and the throughput of each process instance. The conclusion of this analysis is the weighted average value for each item.

process instance

A single initiation, run, and completion of a process in a simulated or real environment.

process instance activities free float analysis

Process instance analysis that returns a list of the task instances in a specific process instance, and quantifies the duration of the period after the task ran and before the subsequent task runs.

process instance analysis

A category of dynamic analysis that provides information based on the simulation results of an individual process instance.

process instance cost analysis

Process instance analysis that displays cost information about the task instances involved in a specific process instance, including the revenue generated from each task instance, the run cost, the wait cost incurred while waiting for resources, allocated resources costs, total cost, and profit.

process instance cost report

A report that shows the results of a process instance cost analysis.

process instance critical path analysis

Process instance analysis that displays the process elements that are included in the critical path, or processing path that takes the longest time to complete of all parallel paths in a process instance, where each path considered begins at a start node or an input to the process and ends at a stop node.

process instance resource allocation analysis

Process instance analysis that displays information about the task instances involved in a specific process instance, including the start time of the task instance, the resources allocated per task instance and quantities of allocated resources, the allocation duration, shortage, and cost.

process instance shortest path analysis

Process instance analysis that displays the process elements that are included in the shortest path, or the process instance that has the smallest number of steps.

process instance time analysis

Process instance analysis that displays time information about the task instances involved in a specific process instance, including the start and finish times of the task instance, elapsed duration, processing duration, and wait time.

process instances summary analysis

A category of process instance analysis that describes the results from process simulation at a case and instance level.

process model

A representation of the real-time business process that is composed of the individual steps or activities that make up the process, contains the conditions that dictate when they occur, and identifies the resources required for its performance or run.

process model analysis	A category of static analysis that provides information based on a process model.
process NPV/IRR analysis	Net Present Value/Internal Rate of Return analysis. Weighted average case analysis that calculates the net present value of the process after a period of time identified by a specified payback period, and considering a specified discount rate depending on the weighted average process cost and profit.
process resource allocation analysis	Weighted average case analysis that displays weighted average resource allocation information for all activities in all process instances that are generated during a simulation.
process resource analysis	Weighted average case analysis that displays a list of the resources allocated on the task instances involved in all the process instances, and shows per resource the weighted average allocation duration, shortage duration, and allocation cost.
process specification query	A predefined query that shows the information in the specification for one or more selected processes.
process statistics query	A predefined query that shows the quantities of elements associated with a process, including resources, roles, organization units, locations, and business items.
processes break even comparison analysis	Analysis that compares the results of process instance break even analyses for two different simulated processes that use the same input parameters.
processes cost comparison analysis	Analysis that compares the results of process instance cost analyses for two different simulated processes that use the same input parameters.
processes cycle times comparison analysis	Analysis that compares the results of process instance cycle times analyses for two different simulated processes that use the same input parameters.
processes duration comparison analysis	Analysis that compares the results of process instance duration analyses for two different simulated processes that use the same input parameters.
processes NPV/IRR comparison analysis	

Net Present Value/Internal Rate of Return comparison analysis. Analysis that compares the results of NPV/IRR analyses for two different simulated processes that use the same input parameters.

processes resource cost comparison analysis

Analysis that compares the cost results of process instance resource cost analyses for two different simulated processes that use the same input parameters.

processes resource times comparison analysis

Analysis that compares the time results of process instance resource time analyses for two different simulated processes that use the same input parameters.

project

A grouping of information related to a single work effort.

Project Tree view

A view that displays the complete contents of all projects. From here, select elements and edit them, or select elements for operations such as exporting.

project versioning

The component that interacts with a *CVS* or *Rational ClearCase* server to share and create version projects and project data.

publisher

The component that sends a copy of a project or some of its elements to a server running WebSphere Business Modeler Publishing Server.

Q

qualification

A definition or measurement of a specific quality required for a role. A qualification can be used to specify the characteristics of a role, whether the role is associated with a person or with another type of resource.

qualified resource availability analysis

Static analysis that displays the times when one or more resources qualified for a specified role is available, and the number of qualified resources during each of these periods.

qualified resource availability for duration analysis

Static analysis that displays the times when one or more resources qualified for a specified role is available for a specified duration.

qualified resource cost analysis

Static analysis that displays the average cost of a specified role during a specified period of time, based on the average cost during the period of all resources that are qualified to perform the role.

qualified resources costs summary analysis

Static analysis that lists all the roles defined in a project and displays the calculated average cost for each role during a specified period of time, based on the average cost during the period of all resources that are qualified to perform each role.

qualified resources for role analysis

Static analysis that displays resources that are qualified to perform one or more roles that you select for the analysis.

query

A reusable request for information about one or more model elements.

query builder

A tool for creating queries.

R

range

A set of values to measure the value of a KPI against. You specify a range by giving the lower and upper bounds for the values. These bounds can be specified either as percentages of the KPI target or as actual values.

recurring time interval

A regular period of time of significance to a process, such as 9 A.M. to 5 P.M. on weekdays.

report

A formatted presentation of information relating to a model that can be seen online or in print, or exported to various file formats.

report catalog

A collection of report templates.

report container

A group of settings that define the overall presentation of a report, including page dimensions and orientation, margin sizes, and options for displaying title, author, and summary information.

Report view

A dashboard view in WebSphere Business Monitor that displays business performance reports relative to a time axis.

repository

A storage area for data. Every repository has a name and an associated type. There are two types of information repositories: local (specific to the process) and global (usable throughout a project).

repository specification query

A predefined query that shows the information in the specification for one or more selected repositories.

resource

A person, equipment, or material used to perform a task or a project. Each resource is a particular occurrence or example of a resource definition. For example, a resource definition called Service Vehicle would yield the Service Vehicle #3 resource.

resource and role leveling analysis

Static analysis that displays the quantity of the resources and roles that each task requires, and the quantity available.

resource availability for duration analysis

Static analysis that displays the times when a specified resource is available for a specified duration.

resource availability for duration report

A report that shows the results of a resource availability for duration analysis.

resource availability analysis

Static analysis that displays the times when a specified resource is available.

resource availability report

A report that shows the results of a resource availability analysis.

resource catalog

A collection of models that represent resources, such as employees, computers, and electric power, to be used as inputs and outputs in process modeling.

resource cost analysis

Static analysis that displays the average cost of a specified resource during a specified period of time.

resource definition

A definition of a person, equipment, or material used to perform a task or a project. Use resource definitions directly in a process, or create a resource (an instance) based on the resource definition.

resource definition template

A category used to model a group of resource definitions that share common properties. After these properties are defined in the template, they are inherited by all resources using the template. For example, an organization might define a number of employees, all of which share properties (such as title, salary, and date of employment) that are defined in an employee definition template.

resource model

A model that defines the resources used in business operations, including their roles, availability, and cost characteristics.

resource roles analysis

Static analysis that displays a list of resources and shows their associated roles.

resource specification query

A predefined query that shows the information in the specification for one or more selected resources.

resource utilization analysis

Dynamic analysis that shows all the resources allocated for the task instances in a simulated process, with their average allocation costs, durations, and shortages.

resources costs summary analysis

Static analysis that displays multiple selected resources and the average cost of each during a specified period of time.

role

The actions, authorities, and qualifications assigned to or expected of a person or group. For example, an employee resource could have the role of Customer Service Representative, Supervisor, or Manager.

role qualified resource analysis

Static analysis that displays a list of roles and the resources that are qualified to perform these roles.

role specification query

A predefined query that shows the information in the specification for one or more selected roles.

roles costs summary analysis

Static analysis that displays the costs of multiple roles for all periods during which the roles are available between a specified start and end time.

rule

A condition that must be satisfied when performing a business activity.

S

schema

A collection of attributes that defines an element definition. A database schema provides a logical classification of database objects.

service

An external entity outside the organization that can be used within the processes of that organization. Examples of services are those that are provided by suppliers or service organizations such as travel agencies, collection agencies, payroll services, security companies, and transportation companies.

service details query

A predefined query that shows information about a service, including the catalog, resources, roles, organization units, locations, and business items that are associated with the service.

service specification query

A predefined query that shows the information in the specification for one or more selected services.

service statistics query

A predefined query that shows the quantities of elements associated with a service, including resources, roles, organization units, locations, and business items.

setting

An attribute and corresponding value. For example, a setting of "Cost: $9.00 USD", defines the cost attribute as having a value of $9.00 USD. A setting "Page size: A4" sets the page size attribute to a value of A4.

shortest path

The processing path that takes the shortest time to complete of all parallel paths in a process instance, where each path that is considered begins at a start node or an input to the process and ends at a stop node.

simulation

A faster-than-real-time performance of a process in a virtual environment. Simulation enables organizations to observe how a process will perform in response to variations of inputs to the process, just as in a real-life work environment. Simulation also provides the ability to vary process input volume over time by adjusting resources and current allocations. Simulation output provides detailed information regarding resource usage levels and the results of cost and cycle-time calculations.

simulation mode

The method of selecting an output path that was used when simulating a process. The term *simulation mode* is displayed in dynamic analysis reports.

simulation profile

A copy of a process that you can customize and run in the simulation view. You can create different simulation profiles within simulation snapshots.

simulation snapshot

A record of a modeling project at the moment when you simulate the process. A simulation snapshot also contains a snapshot settings folder that you can use to specify default values for the attributes of new simulation profiles that you create within the simulation snapshot.

specification

A declarative description of what something is or does.

static analysis

The process of extracting targeted types of information on the models in their static form. Static analysis can be run even if no simulation results are available.

static process cases summary analysis

Analysis that shows details of each of the possible process cases that a simulation profile can produce.

start node

A node that identifies the beginning of a process flow whenever it is not started by another process. A start node is typically used in the top-level process within the project.

stop node

A node that marks the end of a process. When a flow reaches a stop node while the process is running, the process immediately terminates, even if there are other currently running flows in the process.

structure

A series of elements that have been graded or ranked in a useful manner. A structure is a graphical representation of the relationships between different real entities in an organization.

structure definition

A graphical representation of a format that defines a structure. Create structures based on this definition.

subprocess

A process that is also a part of another process. *Subprocess* is another name for a local process.

swimlane

A visually separated row in a process flow diagram that groups all the activities in the process that are performed by a particular combination of roles, individual or bulk resource definitions, classifiers, organization units, or locations. Swimlanes (a name derived from an analogy to lanes in a swimming pool) are visible only when you select the swimlane layout in the process editor.

synchronous

A way of calling an activity in which the calling process waits for the activity to complete.

systems analyst

A specialist who is responsible for translating business requirements into system definitions and solutions.

T

target

A value that a KPI should achieve, such as "300" or "5 days."

task

The basic building blocks in the model. Each task performs a function (does something). Visually, a task represents the lowest level of work shown in the process.

task details query

A predefined query that shows information about a task, including the catalog, resources, roles, organization units, locations, and business items that are associated with the task.

task specification query

A predefined query that shows the information in the specification for one or more selected tasks.

task statistics query

A predefined query that shows the quantities of elements associated with a task, including resources, roles, organization units, locations, and business items.

team support

See project versioning.

template

A grouping of elements that share common properties. These properties may be defined only once, at the template level, and are inherited by all elements using the template. In Java terms, this is an abstract class.

threshold

A setting that applies to an interrupt in a simulation that defines when a process simulation should stop based on a condition existing for a specified proportion of occurrences of an event.

throughput

The average number of times per hour that an activity or a process can deliver output, calculated as an inverse of the average elapsed duration.

timer

A task that produces output at certain points in time.

timetable

A schedule of times. In business process modeling, timetables are typically associated with resources or costs. For resources, timetables indicate availability (such as 9 A.M. to 5 P.M.). For costs, timetables are useful if the cost varies with the time of day or time of year.

timetable specification query

A predefined query that shows the information in the specification for one or more selected timetables.

token

A unit of work that is transferred between nodes in a simulated process. A token might be accompanied by a business item or it might just represent a transfer of control between nodes.

type instance matching analysis

Static analysis that displays a list of the names and attribute values of every instance based on a selected type (such as a business item, an organization definition, or a resource definition).

type instance matching matrix analysis

Static analysis that displays a matrix of the names and attribute values of every instance based on a selected type (such as a business item, an organization definition, or a resource definition).

type structure analysis

Static analysis that displays the occurrences of a selected type (such as a business item, an organization definition, or a resource definition) within a selected set of structure definitions.

U

UML

Unified Modeling Language. A standard notation for the modeling of real-world objects as a first step in developing an object-oriented design methodology.

upstream

Indicates the position of a preceding element or activity in the process flow relative to a particular point. An activity in a process receives inputs from upstream nodes, and sends outputs to other downstream nodes.

W

wait cost

The cost incurred by an activity instance while it is not actively processing because it is waiting for a resource.

wait time

The time an activity spends waiting for resources rather than processing.

weighted average analysis

A category of dynamic analysis that provides information based on the process simulation results for all the possible process instances of a process, aggregated by their run paths (cases). In addition to the results for each case, the analysis displays weighted averages across all cases, where the results for each case are weighted according to the distribution of process instances to that case.

while loop

A loop that repeats the same sequence of activities as long as a condition is true. The while loop tests its condition at the beginning of every loop. If the condition is false from the start, the sequence of activities in the loop never runs.

working duration

The time when a task or a resource is actively working. The working duration of a task can be different from elapsed duration, which might include wait time as well as processing time.

workspace

The directory or disk that contains all project files and information, such as preferences, that might have been customized.

X

XSD

XML Schema Definition. A language for describing XML files that contain schema.

X field

The primary data field in a chart. In a line chart, the X field is typically displayed along the horizontal axis.

Y

Y field

A secondary data field in a chart. In a line chart, the Y field is typically displayed along the vertical axis.